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A Revision of the New World Species of *Thalycra* Erichson, with a Description of a New Genus and Notes on Generic Synonymy (Coleoptera: Nitidulidae)

by

HENRY F. HOWDEN

Entomology Research Institute, Research Branch,
Canada Department of Agriculture, Ottawa, Ontario

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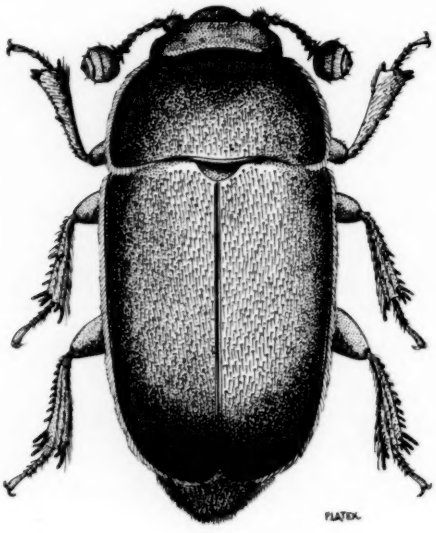
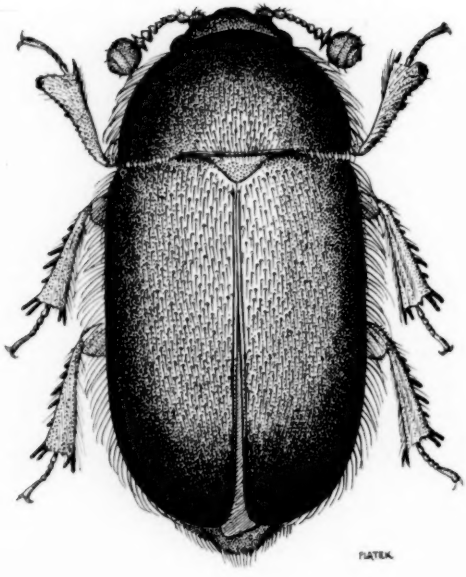


1 Thalycra mixta



2 Pseudothalycra knulli

Figs. 1-2. Dorsal aspect of: 1. *Thalycra mixta*, n. sp., male, 2. *Pseudothalycra knulli*, n. sp., female.

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Introduction

Study of 2,500 specimens has shown it necessary to synonymize *Perthalycra* Horn with *Thalycra* Erichson and *Quadrifrons* Blatchley with *Cychramus* Kugelann. Sixteen species, 12 of them new, are included in *Thalycra* and one new genus, *Pseudothalycra*, is proposed. The larva of one species of *Thalycra* is briefly described and figured, and notes on habits and habitats of some of the species are given in as much detail as possible.

Acknowledgments

During this study, many individuals and institutions assisted me, both in the field and through the loan of material.

During the summer of 1956 and again in September, 1960, I collected Arizona material while at the Southwestern Research Station of the American Museum of Natural History. The help and use of facilities extended to me by Dr. Mont Cazier and others at the station are gratefully acknowledged. The assistance of the American Philosophical Society is also greatly appreciated, as the 1956 Arizona trip was supported by Grant No. 2022 from the Penrose Fund.

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Material was made available for study by many institutions. The abbreviations in parentheses in the following list are the ones used in the text when citing material studied; the names of the curators responsible for loans of specimens follow the abbreviations: Academy of Natural Sciences of Philadelphia (ANSP), J. A. G. Rehn and H. J. Grant, Jr.; American Museum of Natural History (AMNH), Patricia Vaurie; California Academy of Sciences (CAS), H. B. Leech; Canadian National Collection (CNC); Chicago Natural History Museum (CNHM), H. S. Dybas; Cornell University (CU), H. Dietrich; Museum of Comparative Zoology (MCZ), P. J. Darlington; Ohio State University (OSU), J. N. Knull; United States National Museum (USNM), O. L. Cartwright and L. Walkley; University of Arizona (UA), G. D. Butler and F. G. Werner; University of California, Davis (UCD), A. T. McClay; University of Kansas (UnKa), G. W. Byers; University of Michigan (Un Mich), R. Alexander.

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Methods

Collecting

The dearth of information on the species of *Thalycra* has been due, at least in part, to their secretive habits. Most collections contain relatively few specimens and those were usually collected at light or in flight. However, numerous specimens can be collected by setting traps of fermenting malt or molasses in areas where coniferous trees are common. The traps may be made by placing a quarter of an inch of malt or molasses in the bottom of a tin can and adding water to bring the depth to one inch. A pinch of dried yeast is then added to start fermentation and the can is placed with its top level with the ground. The trap should be checked every third or fourth day and is effective for several weeks. However, it is most effective during the early stages of fermentation of the malt.

Though the food of most of the species is unknown, two species were taken while feeding on fungi belonging to the genus *Rhizopogon*. These fungi are essentially subterranean, rarely appearing above the surface of the ground, and are most common in sandy localities where coniferous trees are common. The fungi are most easily found by using the beetles as an indicator. In areas where malt traps yield 15 or 20 specimens in 24 hours it is usually not too difficult to find *Rhizopogon*. Since the fungi are under the litter and from one-half to three inches or more deep, a rake helps in exposing the soil around the bases of the trees. The fungi are spherical and white when young, and become ovoid and dark brown on maturity. The beetles are attracted only to the older fungi, which give off an odor somewhat like that of fermenting apple cider. Both adults and larvae are found in the fungi, the larvae developing in the rotting centers. Only two species, widely separated geographically, were definitely associated with the fungus, one being taken in North Carolina and Texas and the other in British Columbia. From this, I suspect that all of the species may be associated with various species of *Rhizopogon*. In one instance in British Columbia a single *Rhizopogon* was placed in an empty can six feet from a malt trap. Both cans caught between 15 and 20 beetles. All of the specimens taken on the *Rhizopogon* were of one species, while three species were taken in the malt trap. This suggests host specificity among the beetles, but several factors have made this point impossible to establish. The species of *Rhizopogon* are poorly known, and little is known about the range of the species of the fungi. This makes it impossible to correlate the distribution of the beetles with that of any species of *Rhizopogon*. Also, it is nearly impossible to distinguish the species of *Thalycra* in the field. Despite these difficulties, I was able to find some differences in habitat preferences by keeping detailed notes on the immediate area where every malt trap was placed.

The species of *Thalycra* have been collected not only on fungi and by baits, but also, though sparingly, by sweeping in the evening and at light. The adults fly at dusk and in the early evening. Checking some of the malt traps every few hours indicated that most of the beetles in British Columbia come to the traps between dusk and midnight.

Preservation

Specimens collected in malt were washed in alcohol or water and placed in 70 per cent alcohol. If the alcohol became discolored in a few days, it was

changed. Specimens collected at light or in other ways were killed in cyanide and then placed in 70 per cent alcohol. Before mounting, the specimens were usually placed for a few minutes in a 15 per cent ammonia solution, which not only cleaned the specimens, but also relaxed the tissues.

Techniques

Since it is necessary to at least partially extrude the genitalia of both sexes for identification, it was found best to do this immediately after taking the specimens from the ammonia. An insect pin with the last millimeter bent in an arc was used.

Removing the male genitalia is often a time-consuming process. Two capsules, one inside the other, enclose the sclerotized portion of the genitalia. The outer capsule, composed of the eighth tergite and sternite, is visible between the fifth sternite and the pygidium. In removing this capsule it is often possible and desirable to remove the inner capsule and genitalia as well. Care should be exercised, since the unsclerotized internal sac of the genitalia extends approximately a third of the distance into the abdomen and is easily broken. If the entire structure (the two capsules and the genitalia) is removed intact, the parts can be easily separated in a small dish containing alcohol or ammonia. In some specimens both capsules come out, leaving the genitalia. If this happens, a very fine pair of forceps is needed to remove the genitalia, along with the internal sac. If the sac breaks, the only recourse is to dissect the abdomen completely.

In the females, the sclerotized portion of the genitalia is protected by membranous tissues and is therefore easily removed. Often it can be extruded without breaking the tissues.

It is more difficult and time-consuming to remove the genitalia of dried specimens, particularly males. They should first be placed in a humidor for 15 or more hours and then soaked in a 15 per cent ammonia solution for about 15 minutes. The genitalia can then be removed or extruded as described above. However, once the specimen has been dried, it is very difficult to remove the internal sac in its entirety. In about 50 per cent of the specimens I found it impossible. Fortunately, the genitalia and genitalic capsule are usually sufficient for making routine determinations.

Once extracted, the genitalia were treated in various ways. For general identifications, they were either left extruded or removed and glued on a point beneath the specimen. For detailed study, they were softened in ammonia (then removed from the point, if they had been mounted), cleared in hot 10 per cent potassium hydroxide for eight to ten minutes, removed to a dish of acid alcohol to stop the clearing process, washed in 70 per cent alcohol and then placed in glycerin. Some of the genitalia were mounted in balsam, but it was found feasible to make temporary slides with glycerin. After study the genitalia were removed from the slide and placed in a micro-vial containing glycerin. The vial was then placed on the pin with the specimen.

A binocular dissecting microscope was used to study the genitalia and other structures at magnifications ranging from 27 to 72X. Drawings were made with the aid of a net reticule, usually at 54 magnifications. A phase microscope was used in making the larval drawings. In the drawings of the adults, no attempt was made to include all of the spines, hairs, and serrations on either the fore or hind legs. Since the beetles seem to spend a considerable amount of time in the soil, spines are often worn and setae are lost. The drawings therefore only give the general configurations. This is also true of the drawings of the internal sac, since the spines are too numerous to be reproduced accurately.

In the maps the large dots represent localities where the species is known to occur, the stippling the general area where the species may be expected to occur in suitable habitats.

HISTORY AND SYNONYMY

The genus *Thalycra* was proposed by Erichson (1843, p.305) for the single European species *Nitidula fervida* Olivier. LeConte (1850, p.223) described the first North American species from the north shore of Lake Superior as *Amphicrossus concolor*. Horn (1879, p.309) when he revised the North American Nitidulidae, correctly placed *concolor* LeConte in *Thalycra*. At the same time he (p.310) described a related genus, *Perthalycra*, for a single new species, *murrayi*. A third genus, *Quadrifrons*, was proposed for a new species, *castaneus*, from Florida by Blatchley (1916, p.92) and related to *Perthalycra*. Subsequently a second species of *Perthalycra*, *P. carolina*, was described by Wickham (1920, p.232) from North Carolina. This arrangement stood until the present and was left unchanged by Parsons (1943) in his revision of Nearctic Nitidulidae.

The following synonymy is proposed from a study of the North American types and of series of both the European and North American species:

Thalycra Erichson

Thalycra Erichson, 1843, p.305; Horn, 1879, p.309; Parsons, 1943, p.230.
Perthalycra Horn, 1879, p.309; Parsons, 1943, p.232. NEW SYNONYMY.

Horn based his monotypic genus largely on the facts that *murrayi* Horn had somewhat enlarged fore tarsi in the males only and that several distinct teeth were present on the outer margins of the fore tibiae, the latter character not being found in *fervida* Oliv. or *concolor* LeC. Horn seems to imply that the fore tarsi of the females of *Thalycra* are enlarged, but they are not, being similar to those of the females of *murrayi*. Study of the sixteen species included in this paper indicated that it is impossible to separate the species into two genera. All degrees of expansion of the fore tarsi of the males are exhibited, and some of the species with an expanded fore tarsus have teeth on the outer margin of the fore tibia. The reverse is also true, i.e., species in which males lack an expanded fore tarsus may have several to only a single minute tooth on the outer margin of the fore tibia, and in a few individuals the single tooth is lacking. The genitalia of *fervida*, *concolor*, and *murrayi* are very closely related, whereas in other species the genitalia may differ greatly. For these reasons, the above synonymy is proposed.

Cychramus Kugelann

Cychramus Kugelann, 1794, p.543; Horn, 1879, p.318; Parsons, 1943, p.244.
Quadrifrons Blatchley, 1916, p.92; Parsons, 1943, p.234. NEW SYNONYMY.

An examination of the type of *Quadrifrons castaneus* by my colleague W. J. Brown (in 1957) and of the single paratype by myself (after it had been carefully compared with the type by Mr. Brown) indicated the above synonymy. Actually *Quadrifrons* shows little relation to *Thalycra* (or *Perthalycra* as stated by Blatchley, pp.92, 93). The meso- and meta-thoracic legs lack the rows of spines along their outer margins and the labrum is not bilobed. I compared the paratype with *Cychramus zimmermanni* Horn and concluded that *Quadrifrons castaneus* of Blatchley is either very closely related to or a synonym of *zimmermanni*. No attempt was made to establish the specific identity of *castaneus* Blatchley, since it is not closely related to the species of *Thalycra*.

TAXONOMY

The genera discussed in this paper have the antennae capitate; the abdomen covered, with only the pygidium exposed; the labrum free and usually bilobed, though truncate in one species; the pronotum finely margined posteriorly; the mesosternum not carinate; and the prosternum slightly prolonged behind the coxae. These characters place the genera in the subfamily Nitidulinae.

The genera may be distinguished from all other North American Nitidulinae by the oblong, oval body (Figs. 1, 2) as in *Nitidula*, the narrow lateral pronotal margins, the shallow or indistinct antennal grooves, the elytra lacking all but the apical halves of the sutural striae, and the very distinct spines on the outer margins of the meso- and meta-thoracic tibiae.

Key to Genera

Body moderately convex; lateral margins of pronotum and elytra distinctly evident from above; dorsal surface distinctly punctate, at least on pronotum; dorsal setae of moderate length, arising from the punctures; setae on lateral margins of elytra less than 0.09 mm. in length (Fig. 1) ..... *Thalycra* Erich., p. 9

Body strongly convex; lateral margins of pronotum and elytra not or scarcely evident from above; dorsal surface distinctly tuberculate; long dorsal setae arising at bases of tubercles; setae on lateral margins of elytra long, 0.15 mm. or more in length (Fig. 2) ..... *Pseudothalycra* n. gen., p. 49

Thalycra Erichson

Body in cross section moderately convex; margins of pronotum and elytra distinctly visible from above. Dorsal surfaces distinctly punctate, less distinctly so on labrum and elytra. Color tan to brownish-black. Labrum deeply, narrowly emarginate to nearly truncate, with an erect tuft of setae in median emargination; distinctly delimited posteriorly. Clypeus abruptly elevated anteriorly, convex, usually delimited posteriorly by an indistinct suture.

Antenna 11-segmented; proportions of the segments generally as indicated in Fig. 78. Club three-segmented, compact; terminal segment approximately one-fourth as long as club. Mandibles visible from above, extending beyond labrum, abruptly inflexed in outer half, acute at tip, with a small inner tooth near apex. Labial palps three-segmented, the first segment minute, the terminal segment conical. Maxillary palps four-segmented, terminal segment conical, slightly more elongate than apical segment of labial palps. Antennal grooves poorly developed, not extending beyond bases of eyes. Pronotum moderately convex; anterior angles obtuse; narrowly, arcuately margined laterally; posterior marginal line fine, obsolete laterally; posterior margin slightly sinuate. Lateral pronotal margin with an even band of setae (in unworn specimens). Punctures on pronotum usually bearing setae. Scutellum four-fifths as long as wide, nearly one-fourth as wide as elytra; setigerously punctate except along margins.

Each elytron approximately twice as long as wide, margined laterally with an even band of setae (in unworn specimens). Sutural interval present only in the apical two-fifths or half, other intervals absent. Humeral umbone vague; elytral apex rounded. Abdomen covered by elytra, only pygidium exposed. Pygidium wider than long, triangular, apex rounded, surface densely punctate.

Fore coxae slightly more widely separated than middle coxae. Prosternum depressed and expanded behind fore coxae, slightly to moderately prolonged posteriorly. Mesosternum not carinate; metasternum with midline depressed in basal half. Abdomen with first and fifth segments longer than the second, third, or fourth; a sixth segment (actually 8th tergite) visible in the males and forming a capsule around the genitalic capsule. Male genitalia with capsule (tegmen)

enclosing the sclerotized parameres and aedeagus. Female genitalia with coxites contiguous or nearly so; styli relatively near apices.

Fore tarsi of males expanded in some species. Fore tibia expanded to apex, often with teeth along outer margin. Mesothoracic and metathoracic tibiae with spines along outer margins and at apices. Metathoracic tibiae of males varying in shape, straight, arcuate, or sinuate.

All of the species in the genus show a great range of variation in many of the characters. Color seems to vary with the age of the specimen, becoming darker with age. Older specimens have most of the dorsal setae abraded. Dorsal punctures vary in spacing, but are fairly constant in size. The shape of the fore tibia and the number of spines along its outer margin vary considerably, as do the position and number of spines on the other legs. Variation in size is extreme and influences the secondary sexual characters of the males of some of the species. Small males often lack the modifications of the metathoracic tibiae exhibited in larger males of the same species. The shape of the male genitalia and the size of the spines in the internal sac vary slightly with locality in some of the species with wide ranges but are practically constant.

Genotype: *Nitidula fervida* Olivier by monotypy.

In the following descriptions, only the characters that are fairly constant and that may help in making determinations are given. The lengths of the antennal segments, shape of the prosternum behind the coxae, and numbers and sizes of the spines on the mesothoracic and metathoracic legs are not mentioned because of the very slight differences in the antenna and the great variations in the other characters.

Key to the species of *Thalycra*

Abdomen with six visible ventral segments (the small 6th segment evident between pygidium and genitalia when the latter are extruded) (males) 1
Abdomen with five visible ventral segments (females) (female of *intermedia* unknown) 16

Males

1. Outer margin of fore tibia with one or more distinct teeth (except rarely in *murrayi* and *mixta* in which the fore tarsi are not expanded); fore tarsus expanded or not 3
   Outer margin of fore tibia lacking teeth, fore tarsus always expanded (Fig. 3) 2
2. Hind tibia with inner margin distinctly sinuate in basal half (Fig. 14); dorsal punctures of pronotum large and separated by approximately one diameter; Europe ..... (1) *fervida* (Olivier)
   Hind tibia with inner margin slightly sinuate in basal third (Fig. 12); dorsal punctures of pronotum relatively small and separated by approximately one-half diameter; North America: Ontario to British Columbia and northern United States ..... (2) *concolor* (LeConte)
3. Species of eastern forested areas from Michigan to eastern Texas (east of 100th meridian) 4
   Species west of the Great Plains (west of 100th meridian) including species in isolated introduced pine stands in the Great Plains and all Mexican species 5
4. Outer apex of fore tibia only moderately produced; inner margin of hind tibia distinctly sinuate; piedmont and inland regions from South Carolina and Tennessee to Pennsylvania and Michigan ..... (6) *orientalis* n. sp.
   Outer apex of fore tibia prolonged; inner margin of hind tibia nearly straight; coastal plain from North Carolina to Florida and west to Bastrop, Texas ..... (4) *carolina* (Wickham)

5. Apex of genital capsule distinctly emarginate at middle (Figs. 34, 35, and 36); inner margin of hind tibia usually at least shallowly sinuate in basal third or half (Figs. 17, 18, 19, 20) 6

Apex of genital capsule not emarginate, at most slightly indented at midline (*mexicana* may be moderately indented); inner margin of hind tibia with or without serrations, straight or bowed inwardly or outwardly, but never sinuate in basal third or half 8

6. Capsule of genitalia with sides rounded on either side of apical emargination (Figs. 34, 35); punctures of vertex nearly contiguous, with margins of punctures evenly elevated 7

Capsule of genitalia with sides truncate on either side of apical emargination (Fig. 36); punctures of vertex distinctly separated, with anterior margins of punctures slightly elevated; coastal California ..... (9) *truncata* n. sp.

7. Outer margin of fore tibia with two or three distinct teeth; outer apical margin of fore tibia distinctly produced; sides of parameres of genitalia (Fig. 34) sinuate, the tips diverging; British Columbia to central California and Arizona ..... (7) *sinuata* n. sp.

Outer margin of fore tibia with one (occasionally two) small teeth; outer apical margin of fore tibia scarcely produced; sides of parameres of genitalia (Fig. 35) evenly converging to slightly thickened tips; British Columbia to Arizona at higher elevations ..... (8) *mixta* n. sp.

8. Punctures on pronotum usually separated by one-fourth diameter or more, generally regular in shape, with anterior margins not distinctly elevated; labrum distinctly bilobed; teeth at truncate apex of fore tibia with bases only slightly enlarged; capsule of genitalia lacking lateral row or tuft of long setae 9

Punctures on pronotum large, nearly contiguous, irregular in shape, and with anterior margins usually distinctly raised, giving thorax a roughened appearance; labrum truncate or nearly so; teeth at truncate apex of fore tibia with wide bases; capsule of genitalia (Fig. 43) with row or tuft of long setae on each side at bases of arcuate apex; British Columbia to Arizona ..... (16) *leechi* n. sp.

9. Tips of parameres of genitalia pointed (Figs. 30, 31) or acutely (Figs. 38, 39, 40, 41, 42) rounded 10

Tips of parameres of genitalia (Fig. 37) blunt, truncate or nearly so; tubercle on midline of apex of fifth sternite (Fig. 89) small, rounded; British Columbia to Arizona ..... (10) *dentata* n. sp.

10. Sides of parameres of genitalia gradually curved inward to pointed apices (Figs. 30, 31), parameres evenly tapered, with tips contiguous; internal sac with median apical patch of spines distinctly separated from sclerotized portion of genitalia (Figs. 47, 48) 11

Sides of parameres of genitalia rather abruptly curved or sinuous to tips, usually not evenly tapered to tip; tips of parameres often noticeably separated or turned slightly outwards (Figs. 38, 39, 40, 41, 42); internal sac with median apical patch of spines contiguous with sclerotized portion of genitalia (Figs. 55, 56, 57, 58, 59) 12

11. Fore tarsus usually not greatly enlarged; internal sac (Fig. 47) with apical median patch of spines oval in outline; British Columbia to southern Nevada ..... (3) *murrayi* (Horn)

Fore tarsus enlarged, first segment approximately twice as wide as third (Fig. 5); internal sac (Fig. 48) with apical median patch of spines oblong in outline; Arizona ..... (5) *intermedia* n. sp.

12. Inner margin of hind tibia finely but distinctly serrate or denticulate for one-half or more of length, the margin straight or bowed inwardly (Figs. 22, 24) 13

Inner margin of hind tibia lacking distinct serrations for most of its length, margin straight or nearly so (Figs. 25, 27) 15

13. Tips of parameres of genitalia bent slightly outward near apices (Figs. 38, 39); inner margin of hind tibia usually distinctly bowed inwardly (Fig. 24); internal sac with a small distinct patch of spines just anterior to each posteror lateral band of spines (Figs. 58, 59) 14

Tips of parameres not noticeably bent at apices (Fig. 40); inner margin of hind tibia nearly straight (Fig. 22); internal sac lacking a distinct patch of setae just anterior to each posterior lateral band of spines (Fig. 56); Arizona, New Mexico ..... (13) *acuta* n. sp.

14. Color brown to brownish-black; dorsal setae long; median lobe of genitalia very broad, apex evenly arcuate (Fig. 39); central Mexico ..... (12) *mexicana* n. sp.
Color reddish-brown to very dark reddish-brown; dorsal setae of moderate length, median lobe of genitalia not unusually wide, apex abruptly rounded medially (Fig. 38); British Columbia to Arizona ..... (11) *parsoni* n. sp.

15. Middle of fifth abdominal segment at apex with a broad, centrally flattened tubercle (Fig. 92); parameres of genitalia fairly evenly rounded and tapered to slightly out-turned apices (Fig. 41); British Columbia to central California ..... (14) *keltoni* n. sp.
Middle of fifth abdominal segment at apex with a small sharply rounded tubercle (Fig. 91); parameres of genitalia slightly expanded and more angulate near apices (Fig. 42); British Columbia to Arizona ..... (15) *monticola* n. sp.

Females

16. Outer margin of fore tibia with one or more distinct teeth (rarely the teeth are lacking in *orientalis*, which then falls with *concolor;* usually the more southern range and larger size will distinguish *orientalis*) 18
Outer margin of fore tibia lacking teeth; extreme northern U. S., Ontario, Manitoba, British Columbia, and Europe 17

17. Dorsal punctures of pronotum large and separated by approximately one diameter; Europe ..... (1) *fervida* (Olivier)
Dorsal punctures of pronotum relatively small and separated by approximately one-half diameter; North America ..... (2) *concolor* (LeConte)

18. Species of eastern forested areas from Michigan to eastern Texas (east of 100th meridian) 19
Species west of the Great Plains (west of 100th meridian), of isolated, introduced pine stands in plains states, and Mexico 20

19. Outer apex of fore tibia only moderately produced; outer margin of fore tibia with one small, usually distinct tooth; piedmont and inland regions, South Carolina and Tennessee to Pennsylvania and Michigan ..... (6) *orientalis* n. sp.
Outer apex of fore tibia prolonged; outer margin of fore tibia with two distinct teeth; coastal plain from North Carolina to Florida and westward to Bastrop, Texas ..... (4) *carolina* (Wickham)

20. Setate punctures extending to apex of pygidium 21
Setate punctures extending only to apical five-sixths of pygidium, the apex being deflexed, and impunctate; British Columbia to central California and Arizona ..... (7) *sinuata* n. sp.

21. Fifth sternite lacking a distinct protuberance at middle of apex (some *monticola* and some *acuta* from Arizona have a small tumosity) 22
Fifth sternite with a distinct tumosity at middle of apex (Figs. 95, 96); British Columbia to Colorado (some *murrayi* may key out here, separate by genitalia, Fig. 64 ..... (14) *keltoni* n. sp.

22. Teeth on truncate apex of fore tibia generally cylindrical; labrum bilobed; punctures of pronotum with anterior margins raised or not, but fairly uniform and distinctly separated (species separable only with difficulty or by association with males) 23
Teeth on truncate apex of fore tibia broad and slightly flattened; labrum truncate or nearly so; punctures of pronotum with margins usually irregularly elevated, the punctures appearing irregular, nearly contiguous; surface of pronotum appearing rough and with long, conspicuous setae; British Columbia to Arizona ..... (16) *leechi* n. sp.

23. Coxites of genitalia truncate or broadly rounded at apices 24
Coxites of genitalia rather acutely rounded at apices near inner margins (Fig. 64); styli relatively close to apices; vertex and pronotum usually very closely punctate; fifth sternite with a transverse row of long erect setae along apical margin at middle; British Columbia to southern Nevada ..... (3) *murrayi* (Horn)

24. Outer apical angle of fore tibia noticeably produced; outer margin of fore tibia with two to four large distinct teeth 25
Outer apical angle of fore tibia only slightly produced; outer margin of fore tibia with (usually) one or two small teeth ..... (8) *mixta* n. sp. and (15) *monticola* n. sp.
(These species can often be determined only by association with males. Often the sides of the coxites of *mixta* are more strongly expanded than in *monticola*, but this does not appear to be uniform enough to allow for accurate identification.)

25. Punctures of vertex and pronotum moderate in size; anterior margins not noticeably elevated on pronotum; surface between often dull; British Columbia to Mexico usually in inland mountainous areas 26
Punctures of vertex and pronotum large, anterior margins raised; surface between shining; coastal region of California ..... (9) *truncata* n. sp.
26. Fifth sternite with a median, transverse tuft of long erect setae adjacent to apical margin; outer margin of fore tibia with two or three (often three) relatively large teeth on outer margin 27
Fifth sternite without a median, transverse tuft of setae or with tuft indicated by short setae that are usually not contiguous; outer margin of fore tibia usually with two distinct teeth 28
27. Sides of coxites of genitalia (Fig. 71) often laterally expanded at apices; British Columbia to Arizona, most common in southern part of range ..... (11) *parsonsi* n. sp.
Sides of coxites not expanded laterally near apices (Fig. 70); British Columbia to Arizona, most common in northern part of range (sometimes inseparable from *parsonsi*) ..... (10) *dentata* n. sp.
28. Coxites basally relatively wide (Fig. 73); color tan to brownish-black with reddish tinge; Arizona, New Mexico, and Chihuahua, Mexico ..... (13) *acuta* n. sp.
Coxites basally relatively narrow (Fig. 72); color brown to brownish-black normally lacking reddish caste; Durango to Mexico, Mexico ..... (12) *mexicana* n. sp.

1. *Thalycra fervida* (Olivier)

Figs. 14, 28, 45, 62, 82, 100

Nitidula fervida Olivier, 1790, No. 12, p.15.
Strongylus sericeus Sturm, 1839, p.114.
Thalycra sericeus (Sturm), Erichson, 1843, p.306.
For additional references see: Grouvelle, 1913, p.174.

This European species is included in the present study for completeness and because of the doubt that Parsons expressed (1943, p. 231) concerning the separation of *concolor* and *fervida*.

Diagnosis.—The lack of distinct teeth on the outer margin of the fore tibia, and the greatly enlarged fore tarsus of the male, readily separate this European species from all North American species except *concolor*. It may be separated from this species by its larger and more widely separated pronotal punctures. Also, in the males the basal half of the inner margin of the hind tibia of *fervida* is usually sinuate. The apex of the median lobe of the male genitalia (Fig. 28) is concave, not convex as it is in *concolor*. In the female, the bases of the coxites of the genitalia (Fig. 62) are more widely flared than in *concolor*.

Males.—Length 3.3 to 4.8 mm., greatest width 2.0 to 2.5 mm. Color tan to reddish-brown with elytral apices occasionally brownish-black. Clypeus only slightly tumid; delimited posteriorly by an obsolete to shallow indentation, which is usually indicated laterally by a small pit above each mandibular insertion. Coarse punctures of vertex and clypeus close but distinctly separated; margins of punctures evenly elevated. Punctures of pronotum approximately the same size as those of vertex, separated by one-half to one diameter; most punctures bearing fine tan setae. Lateral pronotal uniform band composed of nearly contiguous setae varying in length in different specimens from 0.03 to 0.07 mm. Posterior marginal line of pronotum fine, usually complete. Elytral disc distinctly punctate; punctures usually slightly larger and deeper than pronotal punctures, small and indistinct near elytral apices, most punctures bearing fine, tan setae. Surface between punctures shining, smooth to finely alutaceous. Abdomen with six visible ventral segments, the first approximately three times as long as second; second, third and fourth subequal; fifth segment nearly twice as long as fourth. Fifth segment usually with a small, rounded tubercle on midline at apex (Fig. 82).

Fore tarsus moderately to greatly enlarged. Fore tibia gradually expanded to apex; outer margin lacking teeth, only slightly produced at apex. Inner margin of hind tibia moderately sinuate in basal half (Fig. 14). Capsule of genitalia

rounded, not emarginate at apex. Genitalia (Fig. 28) with sides rounded and tapered to apices; apex of median lobe concave in outline. Internal sac (Fig. 45) with an apical band of spines which is distinctly separated from the sclerotized genitalia; a median, trilobed patch of spines; two posterior lateral bands of spines and a complex basal piece.

Females.—Length 3.5 to 5.0 mm., greatest width 1.9 to 2.6 mm. Color tan to brownish-black. Similar to males except in the following respects: fore tarsus not expanded; fore tibia slightly more slender; inner margin of hind tibia straight or nearly so; dorsal punctures often slightly closer; abdomen with five visible ventral segments, first and fifth segments approximately twice as long as either second, third or fourth which are subequal; fifth segment lacking tubercle but with a transverse row of long setae near apex (Fig. 100); female genitalia (Fig. 62) with slender coxites, long styli near their apices.

Specimens examined, 9 males, 17 females, from England, Germany, Austria, and Czechoslovakia.

While no attempt was made to study a large number of European specimens, the few specimens seen were very uniform in most of the essential characteristics.

Thalycra fervida is certainly distinct from any of the New World species in *Thalycra.*

2. *Thalycra concolor* (LeConte)[1]

Figs. 3, 12, 29, 46, 63, 80; Map 1

Amphicrossus concolor LeConte, 1850, p.223.
Thalycra concolor (LeConte), Horn, 1879, p.309; LeConte and Horn, 1883, p.150; Parsons, 1943, p.231.

Diagnosis.—Males with fore tarsus moderately to greatly enlarged and with outer margin of fore tibia lacking teeth; fifth ventral segment of abdomen with a low, rounded tubercle on midline near apex. This combination of characters will separate *concolor* from all other species of *Thalycra,* except the European species *fervida.* The pointed median lobe of the genitalia and smaller pronotal punctures will readily distinguish it from *fervida.*

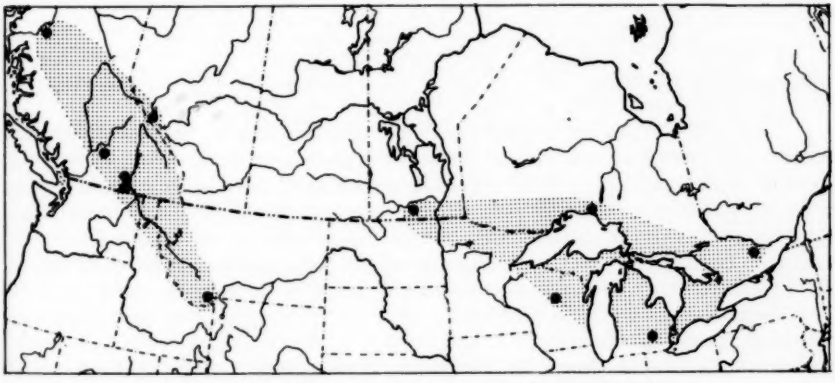
In the females the lack of distinct teeth on the outer margin of the fore tibia will separate them from all species except *fervida* and a few specimens of *orientalis.* The range, usually smaller size, and the shape of the basal portions of the coxites (Fig. 63) will separate *concolor* from these two species.

Males.—Length 3.2 to 4.3 mm., greatest width 1.7 to 2.0 mm. Color tan to brown. Clypeus only slightly tumid; posterior identation obsolete in specimens east of 100th meridian to fairly well delimited in specimens west of 100th meridian; lateral pits above mandibular insertions very small. Vertex and clypeus coarsely punctate; punctures distinctly separated, with margins evenly elevated; surface between punctures smooth and shining. Pronotal punctures slightly smaller than on vertex, close, usually separated by about one-fourth diameter, most with fine yellowish setae. Lateral pronotal band of setae composed of moderately closely spaced setae varying in length in different specimens from 0.04 to 0.07 mm. Elytral disc distinctly punctate; punctures basally usually slightly larger than pronotal punctures, obsolete near elytral apices; most punctures with fine tan setae. Surface beween elytral punctures relatively smooth and shining in basal fourth, finely alutaceous and dull elsewhere. Abdomen with six visible ventral segments, the first three or more times the length of second; second, third and fourth subequal; fifth segment approximately twice as long as fourth. Fifth segment with small rounded tubercle on midline at apex (Fig. 80).

[1]See Addenda

Fore tarsus moderately enlarged in western specimens, greatly enlarged (Fig. 3) in eastern ones. Fore tibia fairly uniformly expanded to apex, more uniform in eastern specimens; distinct teeth lacking along outer margin. Inner margin of hind tibia straight or bowed slightly outwardly (Fig. 12) near middle. Capsule of genitalia (Fig. 29) rather sharply rounded at apex, slightly notched. Genitalia (Fig. 29) with outer margins of parameres rounded and evenly tapered to apices; apex of median lobe abruptly rounded at middle. Internal sac (Fig. 46) with two small lateral and one median oval patch of spines in apical half; posteriorly there is a small, distinctly separated median patch of spines, two distinct lateral bands of spines, and an inverted V-shaped basal piece. The genitalia and internal sac of an eastern specimen are figured, western specimens having the median posterior patch of spines circular, the posterior lateral bands with larger spines, and the basal piece separated into two small rods.

Females.—Length 3.6 to 4.1 mm., greatest width 1.7 to 2.0 mm. Color reddish-brown to brown with elytral apices sometimes darker. Similar to males except in the following respects: fore tarsus not enlarged; fore tibia slightly less widened anteriorly; inner margin of hind tibia straight; abdomen with five visible ventral segments, first almost three times as long as second; proportions of remaining segments as described for males; fifth segment lacking any apical modification; female genitalia (Fig. 63) with coxites long and slender; styli very close to rounded apices.



Map 1. Distribution of *Thalycra concolor* (LeConte).

Specimens examined, 12 males, 7 females:

CANADA

Alberta: 1 ♂, Eisenhower Junction, Banff Natl. Pk., Aug. 1, 1958, malt trap; 1 ♂, Banff Natl. Pk., July 17, 1925; 1 ♀, Lake Louise, June 16, 1926.

British Columbia: 2 ♂♂, 1 ♀, McKinney Road, 10 mi. E. Oliver, June 2-7, 1958, malt trap; 1 ♂, 4000 ft., Rt. 3, East of, and 1 ♀, 5 mi. W. of Osoyoos, June 2, 1958, malt trap; 1 ♀, Midday Val., Merritt, June 14, 1924; 1 ♀, Emerald Mine, July 15, 1928; 1 ♂, Terrace, July 16, 1960, malt trap.

Ontario: 1 ♂, North Shore of Lake Superior (Type: in MCZ, LeConte Collection, No. 6980); 2 ♂♂, Arnprior, June 17, 1935, and July 26, 1936.

Manitoba: 1 ♀, Treesbank (Onah), July 12, 1910.

UNITED STATES

Michigan: 1 ♂, George Reserve, Livingston Co., Aug. 3, 1936.
Montana: 1 ♂, Gallatin Co., July 25.
Wisconsin: 1 ♀, Port Edwards, Wood Co., Aug. 26, 1946.
No data: 1 ♂.

The variation seems to indicate either an east-west cline, with concordant variation in several characters, or a complex of species which grade into the *murrayi* complex. Eastern specimens differ from western ones by having the fore tarsus more noticeably expanded, the fore tibia more gradually expanded to apex, the hind tibia less bowed outwardly, the color more reddish, the median lobe of the genitalia more rounded, the spines in the internal sac generally smaller, and the basal piece not divided. Most of these characters show various degrees of variation in other species, and any one of the differences by itself could be considered variation within one species; taken together they indicate a complex which seems to grade into the *murrayi* complex in the northwestern United States. Until a good series of specimens of the *concolor* complex becomes available so that some limits of variation in one population can be established, it seems best to leave all of the variants under the name *concolor*.

Data on the habits of the species are sparse. The specimens from Arnprior, Ontario, were taken by W. J. Brown while evening sweeping. Some of the western specimens were taken in malt traps set in a mixed stand of pine and fir at elevations ranging from 3000 to 4000 feet.

3. *Thalycra murrayi* (Horn), new combination[1]

Figs. 4, 13, 30, 47, 64, 81; Map 2

Perthalycra murrayi Horn, 1879, pp. 309-310; LeConte and Horn, 1883, p.150; Wickham, 1920, p.233; Parsons, 1943, pp. 232-233.

Diagnosis.—Males have the fore tarsus scarcely (usual) to moderately enlarged, the fore tibia with one to three distinct teeth on outer margin, the inner margin of the hind tibia slightly to moderately bowed outwardly at middle (Fig. 13), the genitalic capsule not emarginate and with the longest setae at the apex, and the parameres of the genitalia with the sides evenly arcuate and tapered to apices. This combination of characters will serve to separate it from all species of *Thalycra*, except possibly *intermedia*, with which it may be confused if the fore tarsus is enlarged. In these cases it can be distinguished by the characters of the internal sac (Fig. 47).

In the females the long, slender coxites of the genitalia with the nearly apical styli will separate them from all other New World species except *orientalis* and *concolor*. The western range will separate *murrayi* from *orientalis*, and the teeth on the fore tibia will separate it from *concolor*.

In Horn's series of cotypes, at least three species are represented. Horn's description appears to be composite, and since no type was designated, the male specimen that shows the greatest similarity to Horn's description has been chosen as lectotype.

Lectotype.—Here designated, bearing lectotype label and "Nev., Horn Coll., H. 3733". In Philadelphia Academy of Sciences. Male, length 4.2 mm., greatest width 2.0 mm. Color dark reddish-brown with elytral apices slightly darker. Clypeus slightly tumid, delimited posteriorly by a shallow indentation that terminates on each side in a very small pit near the mandibular insertions. Vertex and clypeus coarsely punctate; punctures contiguous or nearly so, with margins somewhat irregularly elevated. Pronotal punctures similar to those of vertex

[1]See Addenda

but with margins evenly elevated and punctures separated by one-fourth to one-half diameters; dorsal punctures mostly lacking setae due to abrasion. Lateral pronotal band of setae (where not abraded) composed of nearly contiguous setae approximately 0.06 mm. long; posterior marginal line of pronotum distinct, becoming obsolete laterally. Elytral disc distinctly punctate; most basal punctures slightly larger and more widely separated than pronotal punctures; punctures obsolete near elytral apices. Setae arising from punctures present only laterally, lacking on disc due to abrasion. Surface between punctures mostly smooth, becoming alutaceous on elytral apices. Abdomen with six visible ventral segments, the first three times as long as second; second, third, and fourth subequal; fifth segment twice as long as fourth. Fifth segment with small, rounded, transverse tubercle on midline at apex (Fig. 81).

Fore tarsus very slightly expanded. Fore tibiae (Fig. 4) moderately expanded outwardly at apices, with two distinct teeth along outer margin of right tibia and with three teeth on left tibia. Inner margin of hind tibia slightly bowed outwardly near middle (Fig. 13). Capsule of genitalia (Fig. 30) abruptly rounded at apex. Genitalia (Fig. 30) with parameres arcuate and evenly tapered to apices; median lobe sharply rounded. Internal sac (broken in lectotype) similar to that of *concolor* but with median apical patch of spines transversely oval and with basal piece joined anteriorly and posteriorly (Fig. 47).

Males.—Length 3.5 to 4.8 mm., greatest width 1.7 to 2.2 mm. Color ranges from tan to dark brownish-black. Males vary from the description of the lectotype in the following respects: pronotal punctures with margins sometimes slightly elevated, at least in anterior half of pronotum; width of lateral pronotal band of setae varying from 0.05 to 0.07 mm.; fore tarsi in a few examples moderately expanded; teeth on outer margin of fore tibia rarely obsolete (if so, tarsus not expanded), usually from one to three in number; hind tibia with inner margin occasionally nearly straight. The genitalic characters are quite constant.

Females.—Length 3.7 to 4.5 mm., greatest width 1.7 to 2.2 mm. Color tan to dark reddish-brown. Similar to males except in the following respects: fore tarsus never expanded; fore tibia only slightly expanded at apex; outer margin of fore tibia with two or three teeth; inner margin of hind tibia straight; first ventral abdominal segment slightly less than three times as long as second, remainder of segments with proportions similar to males; fifth abdominal segment with apical transverse tuft of setae which often arises from a small transverse median tubercle (similar to but smaller than in *keltoni*); female genitalia (Fig. 64) with coxites long and slender and with styli adjacent to round or nearly truncate apices.

Specimens examined, 27 males, 15 females:

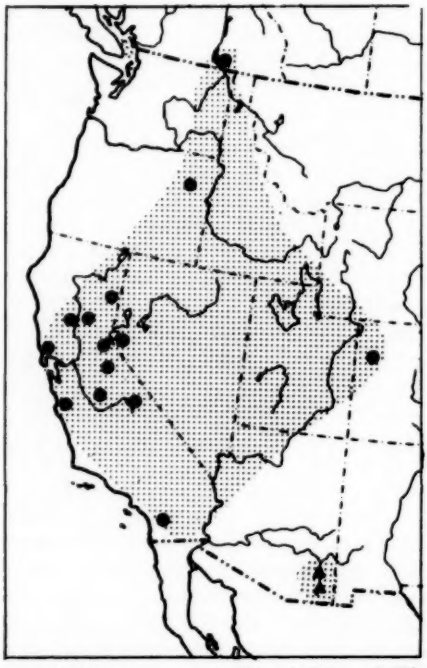
CANADA

British Columbia: 1 ♂, Waterloo Mine, July 18, 1933.

UNITED STATES

California: 1 ♂, Adams Springs, Lake Co., June 18, 1911; 1 ♂, 2 ♀♀, Big Trees, Calaveras Co., July 20, 1907; 1 ♀, Camp Greely, Dunlap, May 22, 1910; 1 ♀, Carmel, Sept. 21, 1921; 1 ♀, Facht, Lassen Co.; 2 ♂♂, Giant Forest, 6500 ft., Tulare Co.; 5 ♂♂, 2 ♀♀, Huckleberry Mdw., 6500 ft., Fresno Co., Aug., 1909; 1 ♀, Fallen Leaf, El Dorado Co., July 11, 1935; 3 ♂♂, Junipero Serra Pk., Santa Lucia Mts., 5800 ft., Monterey Co., Aug. 16, 1956; 1 ♂, Kaweah, Tulare Co.; 1 ♂, Marble Fork, Tulare Co., July; 1 ♀; Meadow Valley, Plumas Co., 4000-5000 feet, June 1928; 1 ♀, Martins Sprs., Lassen Co., July 23, 1922; 1 ♀, Mill Valley, Marin Co., June 21, 1950;

3 ♂♂, Mt. Wilson; 1 ♂, Paradise Valley, Kings River, 7000 ft., Fresno Co., July 23, 1910; 1 ♂, Pollock Pines, El Dorado Co., July 21, 1938; 1 ♂, San Diego; 1 ♂, Summit Mdw., Fresno Co., Aug. 21, 1911; 1 ♀, Tallac.
Colorado: 1 ♂, New Castle, *Picea engelmannii.*
Nevada: 1 ♂, 3 ♀♀, (all Horn coll. including lectotype); 2 ♂♂, Lake Tahoe.
Oregon: 1 ♂, N. Powder Lakes, Aug. 25, 1913.



Map 2. Distribution of *Thalycra murrayi* (Horn) [●] and *Thalycra intermedia,* new species [▲].

The variation in some of the characters of *murrayi,* as noted in the description, may indicate a complex of forms rather than a single species. The amount of expansion of the fore tarsus is unusual in its degree of variation. Likewise, the variation in the number of teeth on the outer margin of the fore tibia is considerable. The genitalic characters are very close to those of *concolor,* particularly the western specimens. Unfortunately, the material on hand was collected from numerous localities, and no good series from one locality was available, so that the limits of variation in a small population could not be established. Some specimens could be confused with *concolor,* if the teeth on the fore tibia are lacking, and can be separated only by the characters of the internal sac and possibly by a difference in the shape of the prosternum. In the few specimens of *concolor* available, the prosternum is produced behind the fore coxae and has its posterior edge nearly vertical. In *murrayi* the prosternum is rounded downward behind the fore coxae and is not noticeably produced. I have not used this character since, in other species of *Thalycra,* it shows considerable intraspecific variation. However, in the series of *murrayi* and *concolor* examined it seemed constant and may prove reliable.

4. *Thalycra carolina* (Wickham), new combination

Figs. 6, 16, 32, 49, 65, 84, 98; Map 3

Perthalycra carolina Wickham, 1920, p.232; Parsons, 1943, p.233.

Diagnosis.—The distribution of the species in the coastal plain of the southeastern United States, coupled with the greatly prolonged outer apical margin of the fore tibia (Fig. 6) and the two distinct teeth on the outer margin of the fore tibia, should serve to separate both sexes of *carolina* from other species of *Thalycra.*

Males.—Length 2.8 to 4.5 mm., greatest width 1.4 to 2.4 mm. Color light tan to dark brownish-black; elytra often darker, sometimes with a dark transverse median band. Clypeus slightly to moderately tumid; usually delimited posteriorly by an impunctate indentation that terminates on each side in a small pit near the mandibular insertions. Clypeus with a few irregular coarse punctures; vertex moderately punctate, the punctures relatively small (for *Thalycra*), separated from each other by approximately one diameter; anterior margins of punctures distinctly elevated. Pronotum moderately, evenly punctate; punctures fairly shallow, often very slightly elevated at anterior margin, usually separated by a distance of one or more diameters; most punctures with fine reddish-yellow setae. Lateral pronotal band of setae composed of nearly contiguous setae approximately 0.06 mm. in length; posterior marginal line of pronotum distinct except near lateral angles. Elytral disc punctate, the punctures normally with setae; basal punctures slightly deeper than those of pronotum, their anterior margins usually elevated; punctures obsolete near apex of elytra. Surface between punctures finely alutaceous, shining in basal half. Abdomen with six visible ventral segments, the first between two and one-half and three times the length of the second; second, third, and fourth subequal; fifth segment approximately one and one-half times the length of the fourth. Fifth segment with a large, flattened V-shaped tubercle on midline at apex (Fig. 84).

Fore tarsus very slightly enlarged. Fore tibia expanded outwardly at apex into a slender tooth-like projection (Fig. 6); two or three distinct teeth are usually present along outer margin of fore tibia. Inner margin of hind tibia straight to very slightly sinuate (Fig 16). Capsule of genitalia (Fig. 32) gradually to abruptly rounded at apex, usually with small notch present. Genitalia (Fig. 32) with parameres gradually tapered to apices, which are bent slightly outwardly; median lobe broadly rounded to nearly truncate. Internal sac (Fig. 49) with a median apical band of distinctly separate, large spines; two posterior lateral bands of spines, and a divided basal piece.

Females.—Length 3.0 to 4.6 mm., greatest width 1.7 to 2.5 mm. Similar to the males except in the following respects: dorsal punctures often slightly larger; fore tarsus not expanded; abdomen with five visible ventral segments, the first four as described in the male; fifth segment approximately twice as long as fourth and with an apical row of long setae (Fig. 98), tubercle lacking; female genitalia (Fig. 65) with coxites relatively slender, acute at apices.

Specimens examined, 45 males, 62 females:

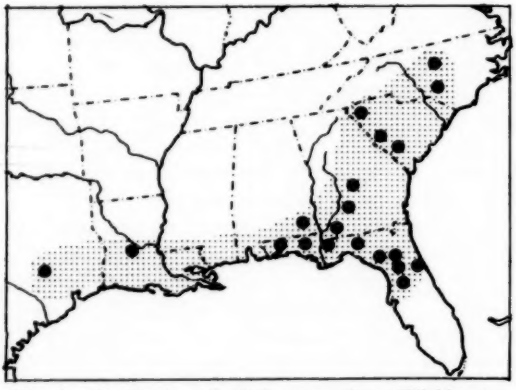
UNITED STATES

Alabama: 5 ♂♂, 3 ♀♀, Seale, March 21, 1954.

Florida: 1 ♂, 2 ♀♀, Archer, March 23, 1953; 1 ♀, DeBarry, March 16, 1956; 2 ♂♂, 1 ♀, De Funiak Spr., March 21, 1954; 12 ♂♂, 8 ♀♀, Gainesville, March 31, 1960; 3 ♂♂, 7 ♀♀, High Springs, March 25, 1953; 5 ♀♀, 14 mi. E. Ocala, March 16, 1956; 1 ♀, Ormand; 1 ♂, 2 ♀♀, Saufley Heights, 8-10 mi. N.E. Pensacola, December, 1944.

Georgia: 1 ♂, Emory Un. Field Sta., Newton, March 31, 1956; 1 ♂, 1 ♀, 10 mi. N. Ft. Valley, March 17, 1956; 1 ♀, Sardis, April 23, 1955.
Louisiana: 1 ♂, 5 ♀♀, 10 miles S. W. Alexandria, March 28, 1960.
North Carolina: 4 ♂♂, 2 ♀♀, Raleigh, April 10, 1953, October 18, 1952; 2 ♂♂, 4 ♀♀, Southern Pines (Includes type and paratype in U.S.N.M.), May 16, 1952, Oct. 31, 1950, November 23 (type).
South Carolina: 2 ♂♂, 3 mi. N. Aiken, April 23, 1955; 1 ♀, 7 mi. E. Allendale, April 23, 1955; 1 ♂, Madison, November 18, 1944.
Texas: 9 ♂♂, 16 ♀♀, Bastrop State Pk., April 7 to 20, 1959.

Despite the variation in color and size, *Thalycra carolina* is quite constant in the majority of its characters throughout its range. The species is largely restricted to the coastal plain pine belt and is associated with underground fungi belonging to the genus *Rhizopogon*. I have collected specimens at Raleigh, North Carolina, feeding on *Rhizopogon nigrescens* Coker and Couch and later found specimens associated with an unidentified species of *Rhizopogon* at Bastrop State Park, Texas. Specimens can easily be collected in fall and early spring in malt traps set in sandy pine areas, particularly in stands of loblolly pine (*Pinus taeda* L.). Occasional specimens have been taken at black light in Georgia and Texas.



Map 3. Distribution of *Thalycra carolina* (Wickham).

5. *Thalycra intermedia*, new species

Figs. 5, 15, 31, 48, 83; Map 2

Diagnosis.—In males the fore tarsus is enlarged, the outer margin of the fore tibia has three or four distinct teeth, and the inner margin of the hind tibia is slightly bowed outwardly (Fig. 15). These characters will separate *intermedia* from all others, except the few examples of *murrayi* that have the tarsus enlarged. It can be distinguished from these atypical *murrayi* by the presence of a large, flattened, apical, median tubercle on the fifth sternite and by the characters of the internal sac (Fig. 48). Females of *intermedia* are unknown.

Holotype.—Male, length 5.3 mm., greatest width 2.7 mm. Color reddish-brown. Clypeus slightly tumid; delimited posteriorly by an indistinct indentation that terminates on each side in a small pit near the mandibular insertions. Vertex and clypeus coarsely, nearly contiguously punctate; margins of punctures somewhat unevenly elevated. Pronotum rather evenly punctate; punctures separated by a distance of one-fourth to one-half diameters, most punctures with long reddish-yellow setae. Lateral pronotal band of setae composed of nearly con-

tiguous setae approximately 0.08 mm. in length; posterior marginal line of pronotum distinct except near lateral angles. Elytral disc punctate, distinctly so in basal half; basal punctures slightly smaller than those on pronotum, separated by approximately one-half diameter; apical punctures obsolete; most punctures with fine reddish-yellow setae. Surface between punctures shining, smooth, becoming finely alutaceous posteriorly. Abdomen with six visible ventral segments, the first almost three times as long as second; second, third, and fourth subequal; fifth twice as long as second. Fifth segment with large flattened tubercle on midline at apex (Fig. 83).

Fore tarsus enlarged. Fore tibia moderately expanded outwardly at apex (Fig. 5), with four distinct teeth along outer margin of right tibia and three teeth on left tibia. Inner margin of hind tibia slightly bowed outwardly near middle (Fig. 15). Capsule of genitalia (Fig. 31) with apex sharply rounded. Genitalia (Fig. 31) with parameres evenly arcuate and tapered to apices; median lobe rounded. Internal sac (Fig. 48) with a median and two lateral apical bands of spines; two large, lateral posterior bands of spines, and an inverted U-shaped basal piece.

Female.—Unknown.

Holotype.—Male, Hospital Flat, Graham Mts., Arizona, Aug. 15, 1953, G. D. Butler, bait trap (CNC No. 7027). *Paratypes*, 3 males: 1 ♂, Chiricahua Mts., Arizona, Sept. 6, 1953, G. D. Butler, beer-molasses trap (UA); 1 ♂, ½ mi. S. Onion Saddle, Chiricahua Mts., Arizona, Sept. 10, 1960, malt trap, H. F. Howden (CNC No. 7027); 1 ♂, Barfoot turnoff, Chiricahua Mts., Arizona, Sept. 8, 1960, malt trap, H. F. Howden (CNC No. 7027).

The three male paratypes measure 3.2 to 4.8 mm. in length and 1.8 to 2.4 mm. in greatest width. Color is reddish-brown with elytral apices slightly darker in the largest specimen. Dorsal setae are lacking in one specimen due to abrasion. The smallest paratype has one tooth on one fore tibia, two on the other, while the other two have two or three teeth on each fore tibia. In other essential respects the paratypes resemble the holotype.

Specimens of *intermedia* were taken in bait traps along with *parsonsi*, *dentata*, and *acuta* and it is possible that the unknown female of *intermedia* is confused with the females of those or other species.

I am indebted to Drs. F. Werner and G. Butler of the University of Arizona for allowing me to retain the type specimen in the Canadian National Collection.

6. *Thalycra orientalis*, new species

Figs. 21, 33, 54, 66, 85; Map 4

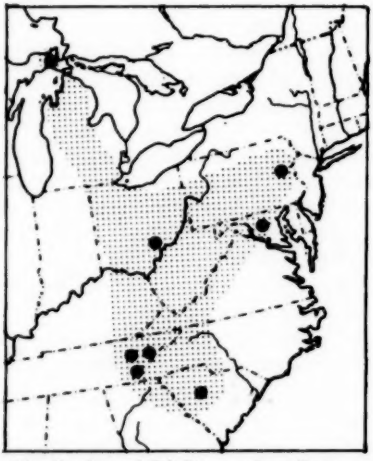
Diagnosis.—The eastern range of this species, from Michigan and Pennsylvania to Tennessee and South Carolina, will easily separate it from all species of *Thalycra* except *concolor* and *carolina*. In the males the distinctly sinuate basal half of the inner margin of the hind tibia (Fig. 21) will readily distinguish *orientalis* from the males of the other eastern species.

In the females the single small tooth on the outer margin of the fore tibia will distinguish the species from *concolor* or *carolina*. In some cases the tooth is lacking (seemingly due to abrasion) making the females of *orientalis* difficult to separate from *concolor*. However, the shape of the genital coxites (Fig. 66), particularly basally, is diagnostic; also *orientalis* is usually larger than *concolor* and has a more southern range.

Holotype.—Male, length 4.9 mm., greatest width 2.6 mm. Color reddish-brown, with apical half of elytra brownish-black. Clypeus only slightly tumid, posterior indented line indistinct. Vertex and clypeus moderately, coarsely punctate; punctures of vertex occasionally contiguous, usually distinct and

separated by one-half diameter or more. Pronotal punctures similar to those of vertex but usually more widely spaced, most with setae arising from their centers. Lateral pronotal band of setae composed of relatively closely spaced setae approximately 0.08 mm. in length; posterior marginal line of pronotum fine, obsolete laterally. Elytral disc distinctly punctate; punctures basally slightly smaller and more closely spaced than those of pronotum, obsolete posteriorly. Dorsal punctures each bearing a fine yellowish seta; surface between punctures smooth and shining to finely alutaceous. Abdomen with six visible ventral segments, the first over three times as long as second; second, third and fourth subequal; fifth segment over twice as long as fourth. Fifth segment with a large V-shaped protuberance on midline at apex (Fig. 85).

Fore tarsus not enlarged. Fore tibiae only slightly expanded outwardly at apices, with one small tooth on outer margin of left fore tibia and two small teeth on right tibia. Inner margin of hind tibia strongly sinuate in basal half (Fig. 21). Capsule of genitalia (Fig. 33) narrowly emarginate at apex. Genitalia (Fig. 33) with outer margins of parameres slightly sinuate to the blunt, rather widely separated apices; median lobe broadly rounded. Internal sac (Fig. 54) with a broad apical band of spines; two posterior, lateral bands which bear very large spines anteriorly; an extremely fine median band of spines; and an inverted U-shaped basal piece.



Map 4. Distribution of *Thalycra orientalis*, new species.

Allotype.—Female, length 4.5 mm., greatest width 2.4 mm. Color reddish-brown with apical half of elytra brownish-black. Similar to male except in the following respects: clypeus moderately tumid, the basal indentation more pronounced; fore tibiae each with one very small (worn) tooth on outer margin; hind tibia not sinuate; abdomen with five visible ventral segments, the first barely three times as long as second; the fifth segment twice as long as fourth and lacking any median protuberance; female genitalia (Fig. 66) with coxites long, rounded beyond styli which are near apices.

Holotype.—Male, Hocking Co., Ohio, Sept. 15, D. J. and J. N. Knull (OSU). *Allotype*.—Female, Chilhowee Mts., Tenn., Oct. 11, 1954, H. and A. Howden, malt trap (CNC No. 7019). *Paratypes*, 2 males, 8 females: 1 ♀ same data as allotype except collected on Oct. 20, 1954 (Howden); 1 ♀, Knoxville, Tenn., May 22, 1954, H. and A. Howden, malt trap (Howden); 1 ♀, Great Smoky

Mtn. Natl. Park, Tenn., Alt. 2000', Nov. 1, 1953, H. and A. Howden (Howden); 1 ♀, Walden Ridge Community, Tenn., June 10, 1955, H. Howden, malt trap (Howden); 1 ♂, 1 ♀, Columbia, Richland Co., S. Car., Oct. 26, 1930, T. H. Hubbell (32) (Un Mich, CNC No. 7019); 1 ♀, Glen Echo, Md., Summer, 1922, J. C. Bridwell (USNM); 1 ♀, Wind Gap, Pa., July 14, 1941, J. W. Green (CAS); 1 ♂, 1 ♀, White-fish Point, Chippewa Co., Mich., July 29, 1914, A. W. Andrews (Un Mich, Nelson).

Variation occurs mainly in size and color. Males vary from 3.5 to 4.9 mm. in length and from 2.0 to 2.6 mm. in greatest width. Females vary from 3.2 to 4.7 mm. in length and from 1.7 to 2.4 mm. in greatest width. Color varies from a uniform tan to dark reddish-brown with the apical half of elytra usually brownish-black. The three males all have the hind tibiae distinctly sinuate in the basal half and with one or two very small teeth on the outer margins of the fore tibiae. In other characters the males are remarkably uniform. In the females, some slight variation is evident in the size of the pronotal punctures and some specimens appear more elongate than others. Usually there is one small tooth on each fore tibia, but in several specimens the tooth is obsolete, perhaps due to abrasion. In other characters, including the shape of the genitalia, they are relatively uniform.

While apparently widely distributed, *Thalycra orientalis* seems to be relatively rare. The few specimens that I have taken personally occurred in areas where *Pinus virginiana* Mill. was scattered among mixed hardwoods. None of the specimens was taken in areas in which pines did not occur.

7. *Thalycra sinuata*, new species[1]

Figs. 7, 19, 20, 34, 52, 67, 86; (larva) 101-106; Map 5

Diagnosis.—In the males the fore tarsus is not expanded and the hind tibia is usually (see section on variation) shallowly sinuate in the basal half (Figs. 19, 20); these characters place this species with *truncata*, *mixta*, and *orientalis*. It can be separated from *mixta* and *orientalis* by the fore tibia, which is produced at the outer apical margin (Fig. 7), and by the presence of two or three well-developed teeth along the outer tibial margin. The shape of the genital capsule (Fig. 34) separates it from *truncata*, and the shape of the genitalia (Fig. 34) is very distinctive.

In the females the fore tibia and tarsus are similar to those of the males. The pygidium has a setate area extending about five-sixths of the distance to the apex, leaving a smooth area at the apex, which serves to separate the females of *sinuata* from those of all other species.

Holotype.—Male, length 4.6 mm., greatest width 2.4 mm. Color dark reddish-brown. Clypeus moderately tumid, delimited posteriorly by an impunctate indentation that terminates on each side in a small pit near the mandibular insertions. Vertex and clypeus coarsely punctate; punctures nearly contiguous, particularly on clypeus. Pronotum rather evenly punctate; punctures similar to those of vertex but with posterior margins not abruptly delimited, some of the punctures appearing oblong; dorsal punctures mostly lacking setae due to abrasion. Lateral pronotal band of setae composed of nearly contiguous setae approximately 0.07 mm. in length; posterior marginal line of pronotum fine but distinct. Elytral disc distinctly punctate basally; punctures not as deep as or as regular as those on pronotum, about one diameter apart, becoming obsolete posteriorly. Setae arising from punctures evident only laterally and basally, absent near suture due to abrasion. Surface between punctures shining, smooth to very finely alutaceous. Abdomen with six visible ventral segments, the first over twice the length of the second; second, third, and fourth segments subequal;

[1]See Addenda

fifth segment approximately one-fourth longer than fourth. Fifth segment with small rounded tubercle on midline at apex (Fig. 86).

Fore tarsus not enlarged. Fore tibiae moderately expanded outwardly at apices (Fig. 7) with two distinct teeth along outer margin of right tibia and three teeth on left tibia. Inner margin of hind tibia moderately sinuate in basal half (Fig. 20). Capsule of genitalia (Fig. 34) narrowly emarginate at apex, sides rounded. Genitalia (Fig. 34) with outer margins of parameres slightly to noticeably sinuate to apices; tips turned outwardly; median lobe pointed. Internal sac (Fig. 52) with a broad apical band of spines, a median patch of small spines just anterior to two lateral bands, a fine median band, and an inverted U-shaped basal piece. In all respects the internal sac is similar to that of *mixta*, the difference being in the size of the spines, which are larger in *sinuata*.

Allotype.–Female, length 5.0 mm., greatest width 2.5 mm. Color brown. Similar to male except in the following respects: most dorsal punctures with setae; two distinct teeth on left fore tibia, three on right; hind tibia not sinuate; abdomen with five visible ventral segments, the first four as described in the male and the fifth about twice as long as fourth, lacking apical tubercle; pygidium setate on apical sixth, which is smooth and shining below an arcuate line of setae; female genitalia (Fig. 67) with coxites nearly contiguous, slightly expanded on outer margins beyond styli and with outer edges rounded.

Holotype.–Male, Kamloops, B.C., June 24, 1958, malt trap, H. and A. Howden (CNC No. 7020). *Allotype*.–Female, same data as holotype (CNC No. 7020). *Paratypes*, 416 males, 409 females:

CANADA

Alberta: 1 ♀, Jasper, August 10, 1936, C. T. Parsons.

British Columbia: 1 ♀, Aspen Grove, August 14, 1933, K. Graham; 6 ♂♂, 2 ♀♀, Copper Mtn., June 30, July 4, August 27, 1929, August 23, 26, 28, 30, 1930, Stace Smith; 1 ♂, Diamond Head Trail, Garibaldi Pk., nr. Squamish, August 18, 1953, S. D. Hicks; 8 ♂♂, 5 ♀♀, Fairview Rd., 3000 ft., Oliver, May 31, June 4, 1958, malt trap, H. and A. Howden; 46 ♂♂, 61 ♀♀, Kamloops, June 24, 1958, malt trap, H. and A. Howden; 10 ♂♂, 8 ♀♀, 28 mi. W. Kamloops, Sept. 3, 1960, malt trap, D. F. Hardwick; 2 ♂♂, Kuskanook, June 29, 1958, malt trap, H. and A. Howden; 1 ♂, Lorna, July 13, 1924, R. Hopping; 67 ♂♂, 53 ♀♀, McIntyre Rd., 3000 ft., Oliver, May 27, June 1, 1958, malt trap, H. and A. Howden; 100 ♂♂, 78 ♀♀, McKinney Rd., 1-10 mi. E. Oliver, June 3, 7, 1958, malt trap, H. and A. Howden; 32 ♂♂, 25 ♀♀, (Meyers Rd.) 6-8 mi. N. W. Oliver, June 14, 1958, malt trap and 21 specimens on *Rhizopogon*, H. and A. Howden; 1 ♂, Nicomen Ridge, July 28, 1922, R. Hopping; 28 ♂♂, 53 ♀♀, Oliver, July 3, 1959, malt trap, L. A. Kelton; 9 ♂♂, 18 ♀♀, 7 mi. N. Oliver, July 7, 1959, malt trap, L. A. Kelton; 8 ♂♂, 6 ♀♀, Rt. 3., 4000 ft., E. Osoyoos, June 2, 5, 1958, malt trap, H. and A. Howden; 10 ♂♂, 7 ♀♀, 1-4 mi. N. E. Penticton, June 4, 1958, malt trap, H. and A. Howden; 5 ♂♂, 3 ♀♀, 5-10 mi. S. Penticton, June 4, 1958, malt trap, H. and A. Howden; 1 ♀, Saanich (Victoria), August 13, 1918, W. Downes; 13 ♂♂, 15 ♀♀, Terrace, July 15, 1960, malt trap, W. R. Richards; 1 ♀, Vernon, July, Venables; 2 ♀♀, Wynndel, June 29, 1958, malt trap, H. and A. Howden.

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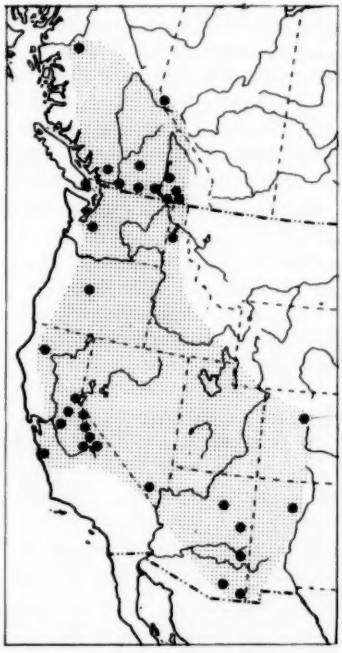
Arizona: 4 ♂♂, 2 ♀♀, Catalina Mts., 20-22 HkHy., September 26, 1954, G. D. Butler; 1 ♂, 4 ♀♀, Chiricahua Mts., August 1, September 6, 1953, beer-molasses trap, G. D. Butler; 31 ♂♂, 34 ♀♀, Chiricahua Mts., Onion Saddle

to Rustlers Park, Sept. 8-10, 1960, malt trap, H. F. Howden; 1 ♀, Hospital Flat. Graham Mts., August 15, 1953, bait trap, G. D. Butler; 1 ♀, Oak Creek Canyon, Flagstaff, June 18, 1954, A. C. Cole; 1 ♀, Pinetop, Navajo Co., June 26, 1950, E. C. Johnston.

California: 1 ♂, 1 ♀, Big Trees, 4700 ft., Calaveras Co., August, F. E. Blaisdell; 3 ♂♂, 3 ♀♀, Carmel, July 14, 1924, August 27, 1921, October 20, 1912, October 25, 1911, November 6, 1921, November 15, 1914, Slevin; 1 ♀, Carrville, Trinity Co., June 25, 1913; 2 ♂♂, 1 ♀, Echo Lake, El Dorado Co., July 12, 20, 1941, A. T. McClay; 1 ♀, Fallen Leaf Lake, Tahoe, July 6, 1915; 1 ♀, Alt. 10,500 ft., 60 Lake Basin, Fresno Co., July 21, 1910; 2 ♂♂, Huntington Lake, July 22, 1936, July 26, 1940, A. T. McClay; 1 ♀, Kings River Canyon Natl. Pk., June 25, 1941, A. T. McClay; 1 ♂, Mt. Lyell, August 7, 1935, 1 ♂, Pollock Pines, El Dorado Co., August 1, 1938, A. T. McClay; 1 ♀, 1 mi. S. W. Tom's Place, Rock Creek, Mono Co., C. D. MacNeill; 1 ♂, S. Fork Kings River, Fresno Co., July 3, 1910, Van Dyke.



Map 5. Distribution of *Thalycra sinuata*, new species.

Colorado: 2 ♂♂, 1 ♀, 8700 ft., Fraser, July 27, 1940, O. B.

Idaho: 1 ♀, Post Falls, July 10, 1929, R. A. Flock.

New Mexico: 1 ♀, Santa Fe Canyon, 7000 ft., August, 1880, Snow.

Nevada: 1 ♂, Charleston Mts., Kyle Canyon, Clark Co., July 22, 1950. E. C. Johnston.

Oregon: 16 ♂♂, 12 ♀♀, Yellow Pine Forest, 13 mi. S. of Bend, Deschutes Co., July 23, 1959, H. B. Leech.

Washington: 1 ♂, Longmire, Rainier Natl. Pk., July 27, 1920; 1 ♀, Southend San Juan Is., July 4, 1940, M. H. Hatch.

Paratypes are deposited in all collections from which material was borrowed.

Variation in the series is considerable. Males vary from 2.7 to 5.6 mm. in length and from 1.9 to 2.7 mm. in greatest width. The females vary from 3.0 to 5.7 mm. in length and from 2.0 to 2.8 mm. in greatest width. The color ranges from a light tan to a dark brownish-black, some of the darker specimens having the elytra lighter apically and basally giving them a banded or spotted appearance. Dorsal punctures on the head and pronotum vary slightly in density, particularly in relation to size; larger specimens have the punctures more pronounced. Elytral punctures are usually evident on larger specimens but may be poorly defined on small ones. Tumidity of the clypeus is usually pronounced, but occasionally is slight; infrequently the impunctate depression at the posterior margin of the clypeus is obsolete. Dorsal setae are always present in unabraded specimens but are usually evident only laterally in old, dark specimens.

Variation in the diagnostic characters of the fore and hind tibiae is so extreme that, on some specimens, only genitalic characters can be relied upon. The apex of the fore tibia is usually produced outwardly (Fig. 7), but only slightly so in some specimens, and in others the fore tibia may be so badly worn from digging that the character is useless. The teeth on the outer margin of the fore tibia in both males and females vary from one to four, but usually number two or three. In the males the sinuosity of the inner margin of the hind tibia appears to be influenced by heterogonic growth. In small specimens the tibia (Fig. 19) may be nearly straight, resembling females in this respect. The spines on the middle and hind tibiae vary considerably in size and number, are subject to abrasion, and consequently do not serve for separating *sinuata* from closely related species.

In the male, the characters of the fifth sternite, the genitalic capsule, and the genitalia show only slight variation and consequently are essential for reliable placement of the species. The internal sac of the male genitalia varies somewhat in the size of the spines, particularly between British Columbia and Arizona specimens. Since the spinal pattern is very similar to that of *mixta*, it should be used with caution.

In the females, the lack of setae on the apical sixth of the pygidium appears to be unique in the genus and allows for ready determination. The female genitalia are moderately constant, except that the length of the coxites beyond the styli varies, as does the degree of lateral expansion of the margins. In some specimens, the shape of the female genitalia appears identical to that of *mixta*.

The habitat of *T. sinuata* seems to be largely limited to areas in which *Pinus ponderosa* Laws. is abundant. In British Columbia the species occurs largely in the valleys, in dry sandy areas where this pine is numerous. In California and Arizona *sinuata* occurs at the higher elevations, in the latter state being found in areas where ponderosa pine is common. Most of the specimens that I collected were taken in malt traps, but a few specimens were taken feeding on *Rhizopogon* (possibly *R. graveolens* (Vittadini) Tulasne) near Oliver, B. C. A single rotting *Rhizopogon* was placed in an empty can and in 24 hours attracted 11 males and 13 females of *sinuata*. A malt can placed six feet away attracted 22 specimens of three species, *sinuata*, *keltoni*, and *dentata*. To me, this indicates the possibility of some host specificity, but this remains to be proven.

The *Rhizopogon* that was used in the trap was saved and examined three weeks later, after an extremely hot day. Five third instars were found, all dead (probably from excessive heat) in the liquefied center of the fungus. These were preserved and are described below, being referred to *sinuata* with some

reservations, since the eggs or larvae may have been in the *Rhizopogon* before it was used as an attractant.

Description of third-stage larva.—The larva of this species of *Thalycra* keys out in Böving and Craighead's "Key to the Larvae of Coleoptera" (1931, p. 36) to the subfamily Nitidulinae. In Hinton's key (1945, p. 81) it falls in the genus *Omosita*, which is only distantly related to *Thalycra*. Because of the lack of descriptive material of closely related species, the illustrations of the larva were made as detailed as possible. Diagnostic characters mentioned in the following description may or may not be valid as the larvae of additional species become known.

Total body length 5.0 to 7.0 mm. Color pale yellowish-white. Dorsal portions of mesothorax and abdomen with numerous, very fine tubercles. Maximum length of head capsule 0.7 mm., maximum width 1.0 mm.

Head capsule with a single small ocellus present at the base of each antenna; setae and proportions as shown (Fig. 101). Antenna three-segmented; four or five minute setae on tip of terminal segment. Clypeus elevated on either side of wide median depression. Labrum delimited posteriorly by a poorly defined suture, anterior margin vaguely trilobed. Mandibles (Fig. 102) symmetrical, each apex ending in a sharp tooth with four distinct teeth below the apex. Between the apical and molar regions is a serrate, setate region. Ventral portions of labrum and clypeus (the epipharynx) with an extremely complex pattern of setae (spines) and sensilla (Fig. 106). In the anterior, median area of the epipharynx are two small setae with four distinct sensilla posteriorly; below these are a group of three or four large setae or spines, followed by two more sensilla. The position of the spines, setae, and sensilla on the epipharynx, in conjunction with the shape of the tormae and other sclerotized structures, should not only serve to separate *Thalycra* from other genera, but be useful in separating the species of *Thalycra*. The maxillae, labium and hypopharynx (Fig. 104) likewise should be useful in distinguishing the species. Maxillary palpus four-segmented, lateral basal portions sclerotized; apex of terminal segment bearing three or four small setae. Apex of maxillary mala (the fused galea and lacinia) with a bifid tooth, a large spine above, and numerous smaller spines and setae at base of the bifid tooth and on apex of mala. Labial palps one-segmented, with six to eight fine setae apically. Glossa (the ligula of Hinton) rather sharply arcuate anteriorly, with numerous setae along anterior margin. Dorsal shield of prothorax lacking pigment. Body generally parallel-sided, subcylindrical. Abdominal segments six to eight with lateral lobes, the ninth segment bearing simple urogomphi (Fig. 105). Biforous elevated spiracles present on metathorax and abdominal segments one to eight. Legs typical of Nitidulinae: four segments and a tarsungulus with a single basal seta; sensilla on metathoracic legs (Fig. 103).

8. *Thalycra mixta*, new species[1]

Figs. 1, 8, 17, 35, 53, 68, 97; Map 6

Diagnosis.—In the males the fore tarsus is not expanded and the hind tibia is sinuate in the basal half (Fig. 17), placing the species with *sinuata*, *truncata*, and *orientalis*. *T. mixta* can be distinguished from *sinuata* by having the fore tibia only slightly produced at the outer apical margin and by the single small tooth on the outer tibial margin; the shape of the genitalic capsule (Fig. 35), with its rounded apices, will separate it from *truncata;* and its western range plus the acute median lobe of the genitalia (Fig. 35) will distinguish it from *orientalis*.

[1]See Addenda

In the females *mixta* is extremely difficult to separate from a number of other species, unless associated with the males. The female genitalia (Fig. 68) with the coxites nearly contiguous and slightly expanded laterally beyond the styli is fairly characteristic as is the shape of the fore tibia which is similar to the males. The fifth sternite (Fig. 97) usually has a median impunctate area with an apical tuft of setae.

Holotype.—Male, length 5.0 mm., greatest width 2.3 mm. Color dark reddish-brown. Clypeus moderately tumid, delimited posteriorly by an impunctate indentation that terminates on each side in a small pit near the mandibular insertions. Surface of vertex and clypeus with coarse punctures, usually separated by a distance slightly less than one-half diameter. Pronotum evenly, coarsely punctate; size and spacing of the circular punctures similar to those on vertex; most dorsal punctures lack setae, due to abrasion. Lateral pronotal band of setae composed of contiguous setae approximately 0.07 mm. in length; posterior marginal line of pronotum fine but distinct. Elytral disc distinctly punctate; punctures not as deep as on pronotum, separated from each other by approximately one diameter, becoming obsolete posteriorly. Setae arising from punctures evident only near lateral margins, elsewhere absent due to abrasion. Surface between punctures shining, smooth to very finely alutaceous. Abdomen with six ventral segments, the first over twice the length of second; second, third and fourth segments subequal; fifth segment about one-fourth longer than fourth. Fifth segment with V-shaped tubercle on apex at midline, similar to *sinuata* (Fig. 68).

Fore tarsus not enlarged. Fore tibia only slightly expanded outwardly at apex (Fig. 8); one small but distinct tooth present apicad to middle of outer margin. Inner margin of hind tibia distinctly sinuate in basal half (Fig. 17). Capsule of genitalia with lateral setigerous areas relatively narrow; apices round on either side of a deep, rather broad, median emargination (Fig. 35). Genitalia (Fig. 35) with outer margins of parameres evenly arcuate or nearly straight to the slightly expanded apices; median lobe with apex acutely pointed. Internal sac (Fig. 53) with a broad apical band of spines which become smaller posteriorly; a median patch of very small spines, just anterior to the two lateral bands; a fine median band; and an inverted U-shaped basal piece. The internal sac is similar to that of *sinuata*, but the spines of the anterior and lateral bands are generally smaller than in *sinuata*.

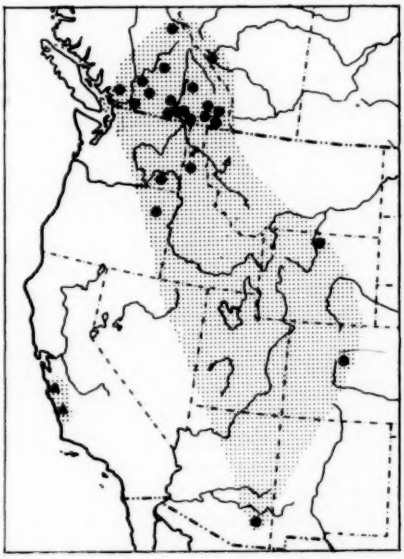
Allotype.—Female, length 5.5 mm., greatest width 2.6 mm. Color reddish-brown. Similar to male except in the following respects: most dorsal punctures bearing setae; fore tibiae with outer margins having one small spine on right tibia and two small spines on left tibia; hind tibiae not noticeably sinuate; abdomen with five visible ventral segments, the first four as described in the male, the fifth segment one-third longer than fourth segment and with a tuft of erect setae at apex of median impunctate area. Female genitalia (Fig. 68) with coxites apically contiguous, slightly expanded beyond styli and with outer edges rounded.

Holotype.—Male, Kamloops, B.C., June 24, 1958, malt trap, H. and A. Howden (CNC No. 7024). *Allotype*.—Female, same data as holotype (CNC No. 7024). *Paratypes*, 67 males, 74 females:

CANADA

Alberta: 1 ♀, Banff, June 25, 1925, O. Bryant; 6 ♂♂, 5 ♀♀, Eisenhower Jct., 4700 ft., Banff Natl. Pk., July 13-22, 1955, W. J. Brown.

British Columbia: 1 ♂, Aspen Grove, July 26, 1932, H. Richmond; 2 ♀♀, Copper Mtn., June 26, 29, 1929, G. Stace Smith; 4 ♀♀, Creston, May 23, 1945, June 17, 1950, 1952, July 2, 1950, G. Stace Smith; 7 ♂♂, 5 ♀♀, (3 mi. N.) Creston, June 27, 1958, malt trap, H. and A. Howden; 1 ♀, Diamond Head Trail, Garibaldi Pk. nr. Squamish, August 18, 1953, S. D. Hicks; 7 ♂♂, 8 ♀♀, Fairview Rd., 3000 ft., Oliver, May 31, June 4, 1958, malt trap, H. and A. Howden; 6 ♂♂, 9 ♀♀, Kamloops, same data as type; 2 ♂♂, 2 ♀♀, Lorna, July 23, 24, 1924, July 5, 8, 1925, *Abies lasiocarpa;* 1 ♂, 3 ♀♀, 2 mi. N. W. Lumberton, 3475 ft., 7 mi. W. Cranbrook, June 27, 1959, malt trap, G. B. Leech; 1 ♂, McIntyre Rd., 3000 ft., Oliver, May 27, 1958, malt trap, H. and A. Howden; 16 ♂♂, 13 ♀♀, McKinney Rd., 7-12 mi. E. Oliver, June 3, 7, 1958, malt trap, H. and A. Howden; 3 ♂♂, Meyers Rd., 8 mi. N. W. Oliver, June 14, 1958, malt trap, H. and A. Howden; 1 ♂, 1 ♀, Midday Valley, Merritt, June 21, 1926, August 25, 1925, W. Mathers; 2 ♀♀, Rt. 3, 4000 ft., E. of Osoyoos, June 5, 1958, malt trap, H. and A. Howden; 4 ♂♂, 4 ♀♀, (3.7 mi.) N. E. of Penticton, June 4, 1958, malt trap, H. and A. Howden; 1 ♂, Quesnel Lake, September 28, 1923, W. Benedict; 2 ♀♀, Richter Pass Rd., 5 mi. W. Osoyoos, June 5, 1958, malt trap, H. and A. Howden; 1 ♂, 2 ♀♀, Sawmill Creek, 6050 ft., Wycliffe, July 22, 1950, H. B. Leech; 2 ♂♂, 1 ♀, Trinity Valley, July 1, 1927, E. A. Rendell, August 21, 1929, J. R. Howell; 1 ♂, 1 ♀, Wynndel, June 29, 1958, malt trap, H. and A. Howden.



Map 6. Distribution of *Thalycra mixta,* new species [●] and *Thalycra truncata,* new species [▲].

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Arizona: 2 ♂♂, 1 ♀, Hospital Flat, Graham Mts., August 15, 1953, bait trap, G. D. Butler.

Colorado: 2 ♂♂, 5 ♀♀, 8700 ft., Fraser, July 27, 1940, O. B.

Idaho: 1 ♀, L. Guard Mt., 6000 ft., Coeur d'Al., August 20, 1932, flight, Terrell.
Oregon: 2 ♂♂, Baker Spring Creek, July 6, 1952, J. H. Baker.
Washington: 1 ♀, Kooskooskie, Walla Walla, August 1, 1932, M. C. Lane.
Wyoming: 1 ♂, Big Horn Natl. Forest, Middle Fork Camp, July 19, 1957, A. & H. Dietrich.

Paratypes are deposited in the following collections: AMNH, CAS, CNC, CNHM, CU, OSU, USNM, UA, UCD, UnKa; Hatch, Howden, Gillogly, Nelson, Parsons and Stace Smith.

Variation in the series is moderate. Size of the males varies from 3.5 to 5.4 mm. in length and from 1.6 to 2.6 mm. in greatest width. In the females size varies from 3.2 to 5.5 mm. in length and from 1.5 to 2.6 mm. in greatest width. Color ranges from tan to a dark brownish-black. Dorsal punctures vary only slightly in size, smaller specimens often having the punctures slightly smaller and shallower, particularly on the elytra. The tumidity of the clypeus and the presence of the impunctate depression at the base of the clypeus is quite constant. Dorsal setae are always present except on abraded specimens.

Variation in the diagnostic characteristics of the fore leg and hind tibiae is moderate, and in a few cases only genitalic characters can be relied upon. Occasionally the apex of the outer margin of the fore tibia is moderately produced, but never to the extent that is normal in *sinuata*. There is usually only one well developed tooth on the outer margin of the fore tibia, but occasionally one or two small additional teeth are present. This is true in both males and females. In the males the sinuosity of the hind tibia may be greatly reduced in small specimens, but is rarely absent. The spines on the middle and hind tibiae vary in size and are often worn.

As is usual for the genus, the characters of the fifth sternite, genitalic capsule and the genitalia in the male are relatively constant and are always diagnostic. As previously stated, the characters of the internal sac are so similar to those of *sinuata* that they must be used with caution.

In the females there is some variation in the length and width of the coxites beyond the styli, and in some cases they can be separated from related species only with difficulty.

Originally this species had been confused with *sinuata*, but in addition to the morphological characteristics, there seems to be a decided difference in habitat preference. While the majority of species of *Thalycra* seem to occur in areas in which various species of pine are common, *mixta* is only abundant in areas where Douglas fir (*Pseudotsuga menziesii* (Mirb.) Franco) occurs. Near Oliver, B.C., *sinuata* occurred in the valley and lower slopes. Higher, at about 4,000 ft., where the fir occurred with ponderosa pine, both species were taken. In one pure stand of Douglas fir, at Creston, B.C., only *mixta* was taken, while 3 miles away at the same elevation in a stand of ponderosa pine, only *sinuata* was taken. I might point out here that this is one instance where extremely detailed notes on the exact location of each malt trap and knowing in which trap each specimen was taken has proved to be extremely useful, since at the time I was collecting the specimens I assumed I was taking a single species.

9. *Thalycra truncata*, new species

Figs. 18, 36, 51, 69, 87; Map 6

Diagnosis.—In the males the fore tarsus is not expanded and the hind tibia is sinuate in the basal third (Fig. 18) placing this species with *sinuata*, *mixta*, and *orientalis*. The shape of the genitalic capsule (Fig. 36), which is truncate on

either side of the apical median emargination will readily separate *truncata* from these related species. In addition there are usually three teeth on the outer margin of the fore tibia and the species appears wider in relation to length than do the related forms.

In the females the size usually is larger than in any other species of *Thalycra* occurring in coastal California. The setae being present over the entire surface of the pygidium will separate it from *sinuata*, the three teeth usually present on the outer margin of the fore tibia will separate it from *mixta*, and the western range will separate it from *orientalis*. The well marked indentation and pits at the base of the clypeus will usually separate it from other species of *Thalycra*.

Holotype.—Male, length 4.5 mm., greatest width 2.4 mm. Color reddish-brown with elytra slightly darker than pronotum. Clypeus only slightly tumid; delimited posteriorly by a distinct, impunctate indentation that terminates laterally on each side in a small pit near the mandibular insertions. Vertex and clypeus coarsely punctate, particularly on clypeus; punctures nearly contiguous; anterior margins elevated presenting an irregular appearance. Pronotum rather evenly punctate; punctures similar to those on vertex, but with anterior margin of each puncture only slightly elevated at most; dorsal punctures mostly lacking setae due to abrasion. Lateral pronotal band of setae composed of nearly contiguous, relatively short setae, approximately 0.05 mm. in length; posterior marginal line of pronotum entire and quite distinct when compared to most of the other species of the genus. Elytral disc distinctly punctate; basal punctures as close as on pronotum but slightly smaller, with anterior margins finely tuberculate near apical four-fifths of elytra; punctures obsolete near apex. Setae present in most punctures; surface between punctures generally smooth and shining. Abdomen with six visible ventral segments, the first over three times the length of the second; second, third, and fourth segments subequal; fifth segment approximately twice as long as second. Fifth segment with small U-shaped tubercle on midline at apex (Fig. 87).

Antennae with third segment approximately one-eighth longer than in *mixta* or *sinuata*. Prosternum moderately produced posteriorly beyond anterior coxae. Fore tarsus not enlarged. Fore tibia moderately expanded outward at apex, but slightly less so than in type of *sinuata;* three distinct teeth along outer margin on each fore tibia. Inner margin of hind tibia distinctly sinuate in basal third (Fig. 18). Capsule of genitalia (Fig. 36) deeply, broadly emarginate at apical median line, truncate on either side of emargination, and sharply angulate at sides. Genitalia (Fig. 36) with the sides of parameres bent inwardly at apical third, tips truncate; median lobe rounded at apex. Internal sac (Fig. 51) similar to those of *mixta* and *sinuata*, with broad apical band of spines; two large posterior bands of spines; a median patch of setae and median band indistinct; and basal piece broken and left in the abdomen.

Allotype.—Female, length 5.9 mm., greatest width 3.1 mm. Color reddish-brown. Similar to the male except in the following respects: abdomen with five visible segments, the first four as described in the male, the fifth nearly twice as long as fourth, lacking any obvious modification (tubercle or tuft of setae); pygidium setate to apex as in male; female genitalia (Fig. 69) similar to those of *mixta* and *sinuata*, but with coxites slightly more expanded at outer apices.

Holotype.—Male, Carmel, Monterey Co., California, Oct. 26, 1916, Slevin Collection (CAS). *Allotype*.—Female, same data as holotype except collected Oct. 25, 1915 (CAS). *Paratypes*, 1 male, 4 females: 3 ♀ ♀, same data as holotype, except collected on Nov. 12, 1918, Feb. 10, 1921, and Feb. 17, 1911 (CAS, CNC

No. 7025); 1 ♂, Cambria Pines, S. Luis Obispo Co., California, Jan. 7, 1939 (CNC No. 7025); 1 ♀, Carmel, California, Dec. 1923, Chamberlain Collection (CU).

In the few specimens seen, variation is moderate. Males vary from 4.2 to 4.5 mm. in length and from 2.1 to 2.4 mm. in greatest width. Females vary from 5.5 to 6.0 mm. in length and from 2.8 to 3.1 mm. in greatest width. Color ranges from reddish-brown to brownish-black. Dorsal punctures show a moderate variation in size and spacing on the pronotum and elytra; the punctures of head and thorax on all of the specimens show the slightly raised anterior margins. The other external characters are quite constant, including the number of teeth on the outer margin of the fore tibia. The genitalia of the two males is very similar, but considerable variation exists in the degree of expansion of the coxites of the female genitalia. In one specimen the sides of the coxites beyond the styli are nearly parallel, with no discernible expansion.

While not mentioned in the diagnosis, *truncata* has several characters that may prove of diagnostic value. The deep indentation at the base of the slightly tumid clypeus, coupled with the punctures of the vertex being slightly raised at their anterior margins, if constant, will allow for ready determination. Also the species appears wider in relation to length than any of the related species. When measured the ratio of width to length was about 0.1 times greater for *truncata* than for *mixta*. However, more specimens are needed before these characters can be properly assessed.

Nothing is known about the habits of *truncata* except for the data on the labels. It is interesting to note that all of the specimens were taken during the winter months, but this is perhaps due to lack of collecting.

10. *Thalycra dentata*, new species[1]

Figs. 23, 37, 50, 70, 89, 99; Map 7

Diagnosis.—The males have the inner margins of the hind tibia finely serrate or denticulate, a character which separates them from all species except *acuta*, *parsonsi* and *mexicana*. The blunt, rather widely separated tips of the genitalia (Fig. 37) will separate *dentata* from these three related species.

In the females the erect transverse tuft of setae on the apex of the fifth sternite and the shape of the genitalia (Fig. 70) will separate them from all the species of *Thalycra* except *parsonsi*. In most cases *dentata* females have the tips of the coxites less expanded and the prosternum slightly narrower behind the coxae than do the females of *parsonsi*, but in some cases the females of *dentata* and *parsonsi* can be separated only by association with the males.

Holotype.—Male, length 5.6 mm., greatest width 2.8 mm. Color reddish-brown. Clypeus slightly tumid; delimited posteriorly by a shallow, punctate indentation that terminates laterally on each side in a small pit near the mandibular insertions. Vertex and clypeus coarsely punctate; punctures nearly contiguous, particularly on the clypeus. Pronotum rather evenly punctate; punctures usually separated by a distance of one-fourth to one-half diameter; most punctures with a long reddish-yellow seta. Lateral pronotal band of setae composed of contiguous setae approximately 0.06 to 0.07 mm. in length; posterior marginal line of pronotum fine but distinct except near lateral angles. Elytral disc distinctly punctate basally; punctures slightly smaller than those on pronotum, separated by approximately one diameter, becoming indistinct near elytral apices; most punctures with a reddish-yellow seta. Surface between punctures alutaceous, shining anteriorly, dull posteriorly. Abdomen with six visible ventral segments, the first two and two-thirds the length of the second; second,

[1]See Addenda

third, and fourth subequal; fifth segment one and one-half the length of the fourth. Fifth segment with a small tubercle on middle at apex (Fig. 89).

Fore tarsus very slightly enlarged. Fore tibiae moderately expanded outwardly at apices, with two distinct teeth along outer margin of right tibia and with three teeth on outer margin of left tibia. Inner margin of hind tibia finely serrate or denticulate and very slightly bowed inwardly (Fig. 23). Capsule of genitalia (Fig. 37) with a distinct apical median notch, sides broadly arcuate. Genitalia (Fig. 37) with sides of parameres slightly sinuate to the blunt apices; apices distinctly separated; median lobe with apex broadly arcuate. Internal sac (Fig. 50) with a very broad median apical band of spines, two large lateral posterior bands, a fine median band, and a divided U-shaped basal piece.

Allotype.–Female, length 5.3 mm., greatest width 2.4 mm. Color reddish-brown. Similar to male except in the following respects: pronotal punctures slightly smaller; fore tarsus not expanded; inner margin of hind tibia straight, not serrate or denticulate; abdomen with five visible ventral segments, the first four as described in the male, the fifth approximately twice as long as fourth, lacking tubercle but with a transverse apical tuft of setae (Fig. 99); female genitalia (Fig. 70) with coxites separated, not noticeably widened beyond styli, apices rounded.

Holotype.–Male, McKinney Road, 4 mi. E. Oliver, B.C., June 7, 1958, malt trap no. 3, H. and A. Howden (CNC No. 7021). *Allotype*.–Female, same data as type (CNC No. 7021). *Paratypes*, 178 males, 146 females:

CANADA

British Columbia: 2 ♂♂, Fairview Rd., 3000 ft., Oliver, June 4, 1958, malt trap, H. and A. Howden; 1 ♂, Kamloops, June 24, 1958, malt trap, H. and A. Howden; 1 ♂, Kuskanook, June 29, 1958, malt trap, H. and A. Howden; 40 ♂♂, 33 ♀♀, McIntyre Rd., 3000 ft., Oliver, May 27, June 1, 1958, malt trap, H. and A. Howden; 54 ♂♂, 49 ♀♀, McKinney Rd., 1-10 mi. E. Oliver, June 3, 7, 1958, malt trap, H. and A. Howden; 1 ♂, Midday Creek, July 12, 1920, Hopping; 1 ♀, 3 mi. N. O. K. Falls, 20 mi. N. Oliver, June 1, 1958, malt trap, H. and A. Howden; 20 ♂♂, 15 ♀♀, Oliver, July 3, 1959, malt trap, L. A. Kelton; 7 ♂♂, 3 ♀♀, 7 mi. N. Oliver, July 7, 1959, malt trap, L. A. Kelton; 6 ♂♂, 4 ♀♀, 3-6 mi. N. W. Oliver, June 14, 1958, malt trap, H. and A. Howden; 10 ♂♂, 7 ♀♀, Rt. 3, 4000 ft., E. Osoyoos, June 5, 1958, malt trap, H. and A. Howden; 3 ♂♂, 11 ♀♀, 1-4 mi. N. E. Penticton, June 4, 1958, malt trap, H. and A. Howden; 13 ♂♂, 13 ♀♀, 5-10 mi. S. Penticton, June 4, 1958, malt trap, H. and A. Howden; 1 ♂, 1 ♀, Richter Pass Rd., 4-9 mi. W. Osoyoos, June 2, 1958, malt trap, H. and A. Howden.

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Arizona: 1 ♂, Catalina Mts., 20 HkHy., September 26, 1954, G. D. Butler; 3 ♂♂, Chiricahua Mts., August 1, 1953, bait trap, G. D. Butler; 3 ♂♂, 1 ♀, Chiricahua Mts., Barfoot turnoff and Onion Saddle, Sept. 8-10, 1960, malt trap, H. F. Howden; 2 ♂♂, 2 ♀♀, Hospital Flat, Graham Mts., August 15, 1953, bait trap, G. D. Butler; 1 ♂, Pinery Canyon, 7000 ft., Chiricahua Mts., July 9, 1956, at light, H. and A. Howden; 1 ♂, Sta. Catalina Mts., August 15, 1938, Bryant.

Colorado: 1 ♂, Hide Away Park, 8300 ft., July 27, 1940, O. Bryant.

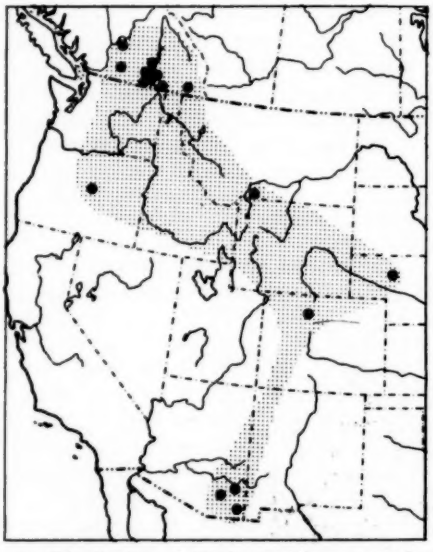
Montana: 1 ♀, Cooke, (Ag.), March 1896, R. P. Currie.

Nebraska: 6 ♂♂, 5 ♀♀, Halsey, June 10-17, July 22, 1957, R. Henzlik.

Oregon: 1 ♂, Ochoco Natl. For., June 13, 1941.

Paratypes are deposited in all collections from which material was borrowed.

Variation in this species is most evident in size and color. Size varies in the males from 3.2 to 6.5 mm. in length and from 1.7 to 3.1 mm. in greatest width. In the females size ranges from 3.8 to 6.2 mm. in length and from 1.7 to 3.0 mm. in greatest width. Color ranges in both sexes from tan to dark brown. The fore tibia is usually distinctly produced at the outer apex, but along the outer margin the number of teeth varies from one to four and rarely a small fifth tooth is present; two or three distinct teeth is usual. In small males (under 4 mm.) the serrations on the inner margin of the hind tibia may be obsolete and the margin straight. The median apical notch of the male genital capsule is usually reduced in depth in small specimens. The coxites of the female genitalia exhibit a moderate amount of variation near their apices, being evenly rounded to abruptly so, making separation from some females of the sympatric species, *parsonsi*, nearly impossible. No obvious geographic variation was noted between British Columbia and Arizona specimens.



Map 7. Distribution of *Thalycra dentata*, new species.

Thalycra dentata was taken in numbers in British Columbia in malt traps set in areas where *Pinus ponderosa* was common. In Arizona, I took a single specimen at a light trap set in a pure stand of *Pinus ponderosa*. While the host of *dentata* was not established, it seems closely associated with areas in which ponderosa pine is dominant. The specimens taken at Halsey, Nebraska, were found in an introduced pine stand, and it seems likely that the beetles were introduced as well, since I have no other records of any species of *Thalycra* from the plains area.

11. *Thalycra parsonsi*, new species

Figs. 24, 38, 58, 71, 88; Map 8

Diagnosis.—The males have the fore tarsus slightly enlarged and the inner margin of the hind tibia serrate or denticulate and bowed inwardly. These

characters separate *parsonsi* from all species except *acuta, dentata,* and *mexicana.* The presence of a small patch of spines in the internal sac on each side just anterior to the posterior lateral bands of spines (Fig. 58) will separate *parsonsi* from *acuta* and *dentata.* The narrower median lobe of the genitalia will distinguish it from *mexicana.*

The females have the fifth sternite with only a small transverse tuft of setae near the median apex, two or three (usually three) distinct teeth on the outer margin of the fore tibia, and the coxites of the genitalia not contiguous, usually widened beyond the styli (Fig. 71). These characters together will separate females of *parsonsi* from all species except *dentata.* Usually the expansion of the coxites beyond the styli will distinguish *parsonsi,* but in some cases it is so slight that the females of the two species can only be separated by association with the males.

Holotype.—Male, length 5.3 mm., greatest width 2.7 mm. Color dark reddish-brown. Clypeus slightly tumid, delimited posteriorly by a shallow, punctate indentation that terminates on each side in a vague pit near the mandibular insertions. Clypeus coarsely, contiguously punctate. Vertex with large, close, coarse punctures usually separated by a distance of less than one-fourth diameter. Pronotum rather evenly punctate; punctures not as large as on vertex, not as sharply delimited, separated by a distance of approximately one-half diameter. Punctures with reddish-yellow setae, except where lacking due to abrasion. Lateral pronotal band of setae composed of nearly contiguous setae approximately 0.06 mm. in length; posterior marginal line of pronotum distinct except near lateral angles. Elytral disc distinctly punctate basally; punctures smaller than on pronotum, usually separated by a distance of approximately one diameter, becoming obsolete posteriorly. Punctures with reddish-yellow setae; surface between punctures finely alutaceous, shining basally, dull apically. Abdomen with six visible ventral segments, the first three times the length of the second; second, third, and fourth subequal; fifth segment approximately one and one-half times the length of the fourth. Fifth segment with a large flattened tubercle on midline at apex (Fig. 88).

Fore tarsus slightly enlarged. Fore tibia with three teeth along outer margin and moderately expanded outwardly at apex. Inner margin of hind tibia bowed inwardly and distinctly serrate or denticulate (Fig. 24). Capsule of genitalia (Fig. 38) narrowly notched at apex, arcuate on either side of notch. Genitalia (Fig. 38) with sides of parameres slightly sinuate near apices which are turned slightly outward and are nearly contiguous; median lobe abruptly rounded at apex. Internal sac (Fig. 58) with a distinct median apical band of spines, a small lateral patch of spines on each side just anterior to the posterior lateral bands, and a divided basal piece.

Allotype.—Female, length 5.7 mm., greatest width 2.7 mm. Color reddish-brown. Similar to male except in the following respects: punctures of vertex smaller, nearly the size of pronotal punctures; fore tarsus not expanded; inner margin of hind tibia straight, not serrate or denticulate; first sternite slightly less than three times the length of second; fifth sternite approximately twice the length of the fourth; fifth sternite lacking tubercle, having a transverse apical tuft of setae; female genitalia (Fig. 71) with coxites not contiguous, slightly expanded beyond styli.

Holotype.—Male, Chiricahua Mts., Ariz., August 1, 1953, bait trap, G. D. Butler (CNC No. 7022). *Allotype.*—Female, same data as type except September 1, 1953 (CNC No. 7022). *Paratypes,* 93 males, 49 females:

CANADA

British Columbia: 1 ♂, 1 ♀, Creston, May 9, 1952, June 4, 1946, G. Stace Smith; 1 ♂, Fairview Rd., 3000 ft., Oliver, May 31, 1958, malt trap, H. and A. Howden; 1 ♀, Goldstream, May 24, 1927, W. Downes; 1 ♂, Kaslo, June 5, H. G. Dyar; 2 ♂♂, 6 ♀♀, McIntyre Rd., 3000 ft., Oliver, May 27, June 1, 1958, malt trap, H. and A. Howden; 1 ♂, McKinney Rd., 1 mi. E. Oliver, June 3, 1958, malt trap, H. and A. Howden; 1 ♂, Oliver, May 15, 1929; 6 ♂♂, 5 ♀♀, Oliver, July 3, 1959, malt trap, L. A. Kelton; 1 ♂, 6 mi. N. Oliver, June 25, 1958, on *Rhizopogon*, H. and A. Howden; 1 ♀, 7 mi. N. Oliver, July 7, 1959, malt trap, L. A. Kelton; 1 ♀, Rt. 3, 9.8 mi. E. Osoyoos, June 5, 1958, malt trap, H. and A. Howden; 1 ♂, Pender Harbour, June 18, 1928, G. R. Hopping; 2 ♂♂, 1 ♀, 3-5 mi. N. E. Penticton, June 4, 1958, malt trap, H. and A. Howden; 1 ♂, 1 ♀, 10 mi. S. Penticton, June 4, 1958, malt trap, H. and A. Howden; 1 ♂, Robson, June, 1943, H. R. Foxlee; 1 ♂, Salmon Arm, June 14, 1928, H. B. Leech; 1 ♂, Salt Spring, June 12, 1931, W. Downes; 1 ♂, 4 ♀♀, Sanca, May 24, 1933, June 5, 14, 27, 1933, July 3, 1933, G. Stace Smith; 1 ♂, Summerland, May 26, 1933, A. N. Gartrell.

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Arizona: 11 ♂♂, 4 ♀♀, Chiricahua Mts., August 1, September 6, 1953, beer-molasses trap, G. D. Butler; 1 ♂, Chiricahua Mts., (labelled N. M.?) August 7, 1941, R. H. Beamer; 17 ♂♂, 6 ♀♀, Chiricahua Mts., Onion Saddle to Rustlers Park, Sept. 8-10, 1960, malt trap, H. F. Howden; 1 ♂, Flagstaff, July 27, 1936, R. H. Beamer; 10 ♂♂, 7 ♀♀, 7500 ft., Huachuca Mts., Cochise Co., Ariz., Aug. 6, 1952, H. B. Leech, J. W. Green.

California: 1 ♂, Alameda Co., March 6, 1906, F. W. Nunenmacher; 1 ♂, Anderson Valley, Mariposa Co., March 11, 1914; 2 ♂♂, Ash Mt. R., Sequoia Natl. Pk., April 25, 1949, R. C. Bechtel; 1 ♂, Carmel, May 31, 1924; 15 ♂♂, 10 ♀♀, Carmel, Monterey Co., January, February, March, April, June, August, December, L. S. Slevin; 1 ♂, Hayfork, Trinity Co., April 27, 1914; 1 ♂, Jamestown, Tuolumne Co., May 28, 1955; 1 ♂, Kaweah, Hopping; 1 ♂, Mill Valley, Marin Co., April 19, 1950, H. B. Leech; 1 ♂, 1 ♀, Mokel Hill (Calaveras Co.), March; 1 ♂, Mt. St. Helena, April 16, 1952, R. P. Allen; 1 ♂, Placer Co.; 1 ♂, S. Fk. Sacramento River, 5200 ft., Siskiyou Co., July 8, 1953, H. P. Chandler.

New Mexico: 1 ♂, near Hot Springs, 7000 ft., Las Vegas, August 1882, F. H. Snow.

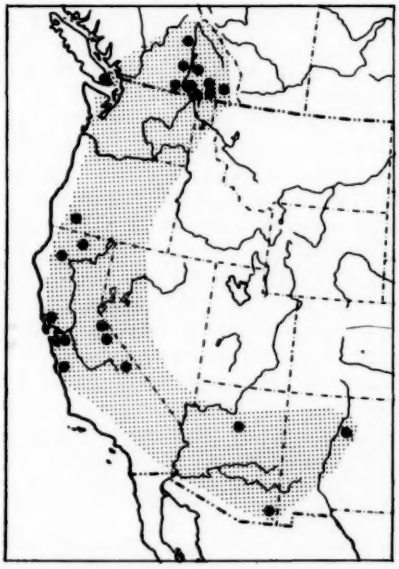
Oregon: 1 ♂, Prospect, June 14, 1941, A. T. McClay.

Paratypes are deposited in the following collections: AMNH, CAS, CNC, CU, MCZ, OSU, USNM, UA, UnKa, UCD, Gillogly, Howden, Nelson, Parsons, Stace Smith.

Variation in this species is not only evident in local populations but shows some geographic relationship. Over the entire range males vary from 3.4 to 6.5 mm. in length and from 1.7 to 3.2 mm. in greatest width. Females vary from 3.9 to 6.1 mm. in length and from 2.0 to 3.0 mm. in greatest width. Color ranges from tan to dark brownish-black. Dorsal punctures are smaller and more widely separated on small specimens. Teeth on the outer margin of the fore tibia vary from one to four in number, but three is usual. The inner margin of the hind tibia in males may be nearly straight in small specimens, but is always serrate or denticulate. The female genitalia vary in the amount of expansion

of the coxites beyond the styli, even in restricted samples, and specimens that do not have the coxites expanded and that occur sympatrically with *dentata* are often impossible to determine.

Geographic variation occurs in several characters. Specimens from the southern part of the range (Arizona) average larger than more northern specimens or those from coastal California. The small patches of spines just anterior to the posterior lateral bands of spines in the internal sac of the males are smaller in northern specimens and nearly obsolete in specimens from coastal California. The tubercle on the fifth sternite of the male which is broad and flattened in Arizona specimens becomes narrow and more rounded in California and British Columbia specimens. These differences appear quite constant and it is possible that *parsonsi* represents a complex of two or three species or subspecies.



Map 8. Distribution of *Thalycra parsonsi*, new species.

Little is known about the habits of *parsonsi*. Most of the specimens were taken in malt traps set in areas where *Pinus ponderosa* is common. One male was found on a decayed *Rhizopogon* near Oliver, B.C., and I presume that this underground fungus is its normal food.

The species is named in honor of Dr. Carl T. Parsons, Dorset, Vermont, who has not only furnished some of the specimens used in the present study, but who has done valuable work in the family Nitidulidae.

I am indebted to Drs. F. Werner and G. Butler, University of Arizona, for letting me retain the holotype and allotype in the Canadian National Collection.

12. *Thalycra mexicana*, new species

Figs. 39, 59, 72; Map 9

Diagnosis.—The males have the hind tibia distinctly bowed and serrate (or denticulate), a character which usually separates *mexicana* from all species except

dentata, *parsonsi*, and possibly *acuta*. The moderately expanded fore tarsus, two teeth on the outer margin of the fore tibia, and the broadly arcuate apex of the median lobe of the genitalia will serve to separate *mexicana* from these related species.

Females are difficult to separate from the closely related species, the shape of the female genitalia (Fig. 72) being the only useful character. The range may prove useful since, at present, *mexicana* is the only species known to occur in central Mexico.

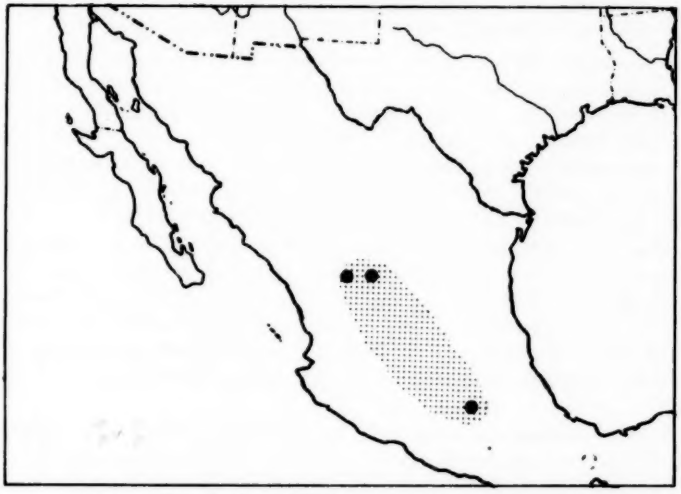
Holotype.—Male, length 4.5 mm., greatest width 2.2 mm. Color brown. Clypeus slightly tumid; delimited posteriorly by a nearly impunctate indentation that terminates on each side in a small pit near the mandibular insertions. Vertex and clypeus coarsely punctate, punctures of vertex with margins only slightly uneven, usually distinctly separated by a distance of approximately one-fourth diameter. Punctures of pronotum similar to those of vertex in size and spacing, slightly smaller than related species; each puncture with a long reddish-yellow seta. Lateral pronotal band of setae composed of nearly contiguous to contiguous setae approximately 0.08 mm. in length; posterior marginal line of pronotum finely indicated except near lateral angles. Elytral disc moderately punctate basally; punctures one-third smaller than on pronotum and separated in basal half of elytra by approximately one diameter, becoming obsolete posteriorly. Most punctures bearing a fine, reddish-yellow seta. Surface between punctures finely alutaceous, shining basally, dull apically. Abdomen with six visible ventral segments, the first three times as long as second; second, third and fourth subequal; fifth segment one and one-half times as long as fourth. Fifth segment with a poorly defined flattened tubercle on midline at apex. Fore tarsus moderately enlarged. Fore tibia abruptly produced outwardly at apex and with two distinct teeth along outer margin of tibia. Inner margin of hind tibia similar to that of *parsonsi* (Fig. 24), distinctly serrate or denticulate and bowed inwardly. Capsule of genitalia (Fig. 39) broadly rounded and with a moderately wide, apical, median notch. Genitalia (Fig. 39) with sides of parameres sinuous near apices, apices not contiguous; apex of median lobe very broadly arcuate. Internal sac (Fig. 59) with an apical median band of large spines; a small patch of very large spines on each side just anterior to the posterior lateral bands; and a divided basal piece.

Allotype.—Female, length 3.9 mm., greatest width 2.0 mm. Color brown. Similar to male except in the following respects: fore tarsus not enlarged; hind tibia with inner margin straight and not denticulate; abdomen with five visible ventral segments, first segment deformed; remaining segments with same proportions as described in male, fifth segment lacking any obvious apical modification; female genitalia (Fig. 72) with coxites slightly divergent, rounded apically and with a minute indentation near the middle of each rounded apex.

Holotype.—Male, north slope Popocatepetl, 13000 feet, Mexico, Mexico, August 11, 1954, J. G. Chillcott (CNC No. 7139). *Allotype*.—Female, same data as holotype (CNC No. 7139). *Paratypes*, 1 male, 1 female: 1 ♂, Coyotes, Durango Dist., 8300 feet, Durango, Mexico, August 8, 1947, M. Cazier (AMNH); 1 ♀, 6 mi. N. E. El Salto, 8500 feet, Durango Dist., Durango, Mexico, August 10, 1947, M. Cazier (Gillogly).

The male paratype measures 4.5 mm. in length and 2.2 mm. in greatest width. The female measures 5.3 mm. in length and 2.6 mm. in greatest width. Both specimens are dark reddish-brown in color and have the dorsal setae somewhat abraded. In both specimens the genitalia were not removed in entirety, the

internal sac being broken in the male and the tip of the coxites broken in the female. In some features the specimens are not typical, differing not only in color from the types, but by having the indentation at the base of the clypeus obsolete. In the male the fore tarsus is only slightly expanded and the median lobe of the genitalia is not as broadly rounded as in the type. The paratypes, in these characters, appear to be intermediate between the types of *mexicana* and typical *parsonsi*. However, the fore tibia of both paratypes have only two distinct teeth on the outer margin while three is typical for *parsonsi*. Until additional material becomes available, it seems best to consider the Durango specimens as falling within the range of possible variation of the species *mexicana*.



Map 9. Distribution of *Thalycra mexicana*, new species.

13. *Tralycra acuta*, new species[1]

Figs. 22, 40, 56, 73, 90; Map 10

Diagnosis.—In the males, the distinctly serrate or finely toothed inner margin of the hind tibia will place *acuta* with *dentata*, *parsonsi*, and *mexicana*. The sharply pointed tips of the parameres of the genitalia (Fig. 40), very slightly enlarged fore tarsus, outer margin of fore tibia usually with two distinct teeth, and the small rounded tubercle on the apex of the fifth sternite, are characters that should separate males of *acuta* from the related species.

In the females, the moderately produced outer apex of the fore tibia with two distinct teeth along outer margin, the lack of any modification of the fifth sternite or the pygidium, the large and fairly uniform pronotal punctures, and the western range will place them with *dentata*, *parsonsi*, and *mexicana*. Females of *acuta* can usually be separated from these species by using the genitalic characters (Fig. 73).

Holotype.—Male, length 4.5 mm., greatest width 2.3 mm. Color light reddish-brown. Clypeus only slightly tumid; delimited posteriorly by a vague punctate indentation, which is terminated laterally on each side above mandibular insertions by a vague impunctate indentation. Vertex and clypeus coarsely punctate; punctures large and nearly contiguous, with anterior margins abrupt and elevated to a slightly greater degree than posterior margins. Pronotum

[1]See Addenda

coarsely punctate; punctures nearly contiguous laterally to separated by about one-fourth diameters medially; anterior margins slightly elevated; most punctures bearing a long reddish-yellow seta. Lateral pronotal band of setae composed of contiguous setae 0.06 to 0.07 mm. in length; posterior marginal line of pronotum present except near lateral angles. Elytral disc basally with punctures often oval in shape, irregularly spaced, and occasionally with a very small tubercle on anterior margin; punctures small to obsolete near apex of elytra; most punctures bearing setae similar to those on pronotum. Surface between punctures shining, very finely alutaceous. Abdomen with six visible ventral segments, the first slightly less than three times the length of the second; second, third, and fourth subequal; fifth segment approximately one-fourth longer than fourth. Fifth segment with a small rounded tubercle on midline at apex (Fig. 90).

Fore tarsus slightly enlarged. Fore tibia moderately expanded outwardly at apex, with two distinct teeth on outer margin. Inner margin of hind tibia bowed very slightly inwardly, distinctly serrate (Fig. 22). Capsule of genitalia (Fig. 40) narrowly notched at apex, sides broadly rounded. Genitalia (Fig. 40) with sides of parameres slightly sinuate, tips acute and narrowly separated; median lobe rounded at apex. Internal sac (Fig. 56) with a median apical band of spines, two posterior lateral bands of spines and a divided basal piece.

Allotype.—Female, length 4.6 mm., greatest width 2.3 mm. Color light reddish-brown. Similar to male except in following respects: fore tarsus not expanded, right fore tibia with a small third tooth on outer margin; hind tibia not serrate, straight; abdomen with five visible segments, the first four as described in the male, the fifth approximately twice as long as fourth and lacking any apical modification; female genitalia (Fig. 73) with coxites relatively broad and slightly separated.

Holotype.—Male, Pinery Canyon, 7000 feet, Chiricahua Mts., Arizona, July 9, 1956, at light, H. and A. Howden (CNC No. 7026). *Allotype*.—Female, same data as holotype (CNC No. 7026). *Paratypes*, 82 males, 57 females:

MEXICO

Chihuahua: 1 ♀, San Jose Babicora, July 5, 1947, Michener.

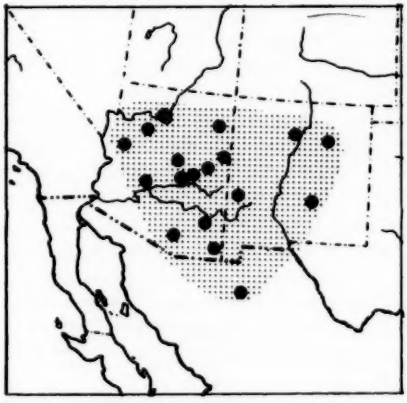
UNITED STATES

Arizona: 4 ♂♂, 1 ♀, Bear Canyon, Pima Co., July 6, 1959, R. H. Arnett; 3 ♂♂, 2 ♀♀, Chiricahua Mts., July 19, 1952, August 2, 12, 1952, D. J. and J. N. Knull; 11 ♂♂, 9 ♀♀, Chiricahua Mts., August 1, September 6, 1953, 1954, beer-molasses trap, G. D. Butler; 7 ♂♂, 8 ♀♀, Chiricahua Mts., July 8, 1908, July 27, 28, 1916, July 29, August 4, 1933, Bryant; 4 ♂♂, Chiricahua Mts., Onion Saddle to Rustlers Park, Sept. 10, 1960, malt trap, H. F. Howden; 1 ♂, 4 ♀♀, 4 mi. S. W. Forestdale, Navajo Co., August 23, 24, 1952, in pine forest, Leech and Green; 1 ♂, Gila Co., August 1-15, 1925, A. C. Poling; 1 ♂, Grand Canyon, June 15, 1953, A. and H. Dietrich; 1 ♂, Greer, 8000 ft., July 3, 1958, A. and H. Dietrich; 3 ♀♀, Hospital Flat, Graham Mts., August 15, 1953, bait trap, G. D. Butler; 2 ♂♂, 5000-6100 ft., Middle Pioneer Camp, Pinal Mts., Gila Co., August 16, 1950, Cohn, Boone, Cazier; 1 ♂, Mormon Lake, 7000 ft., July 8-15, 1956, light, F. Werner; 1 ♂, Mormon Lake, August 13, 1938, D. J. and J. N. Knull; 8 ♂♂, 5 ♀♀, 3 mi. N. Payson, Gila Co., 5700 ft., July 23, 1937, Rehn, Pate, Rehn; 10 ♂♂, 5 ♀♀, Pinery Canyon, same data as type; 1 ♂, 5400 ft., 5 mi. W. Portal, S. W. Res. Sta., Cochise Co., July 19, 1955, M. Cazier; 1 ♂, Prescott, C. Palm; 1 ♂, 1 ♀, Prescott, Yavapai Co., July 25, 1948, C. and P. Vaurie; 1 ♂, Prescott, June 27, 1957,

G. Butler, F. Werner; 4 ♂ ♂, 3 ♀ ♀, Prescott, July 13, August 8, 1917; 12 ♂ ♂, 13 ♀ ♀, 7500 ft., Springerville, Apache Co., August 15, 1935, I. J. Cantrall (No. 159); 1 ♂, 1 ♀, White Mts., July 10, 13, 1933, Parker; 1 ♂, Williams, July 2, 1953, E. S. Ross.

New Mexico: 1 ♀, Jemez Mts., August 9; 1 ♂, Las Vegas, August 3, H. S.; 1 ♂, Pecos Natl. Forest, August 22, 24, 1916, C. Heinrich; 1 ♂, Whitewater Canyon, 4 mi. N. E. Glenwood, Catron Co., August 20, 1952, Leech, Green.

Paratypes are deposited in the following collections: ANSP, AMNH, CAS, CNC, CU, MCZ, OSU, USNM, UA, UCD, UnKa, Un Mich, Gillogly, Howden, Nelson, Parsons.



Map 10. Distribution of *Thalycra acuta*, new species.

Variation is moderate to considerable in a number of characters. Size of the males varies from 2.9 to 5.4 mm. in length and from 1.5 to 2.7 mm. in greatest width. Females vary from 3.4 to 5.1 mm. in length and from 1.7 to 2.5 mm. in greatest width. Color ranges from tan to a very dark reddish-brown. Dorsal punctures show some variation in size and degree of separation, but normally are very close or contiguous. Dorsal setae are often lacking due to abrasion. The teeth on the outer margin of the fore tibia vary from one to three in number, but in the majority of specimens only two large teeth are present. In males the inner margin of the hind tibia is straight to slightly inwardly bowed, and appears at least finely serrate or denticulate for over two-thirds of its length. The tubercle on the apex of the fifth sternite varies somewhat in size, but is usually not flat or concave on top. All of the characters listed above show enough variation so that some specimens of *acuta* cannot be distinguished from some specimens of the sympatric species *parsonsi*, making accurate identification dependent upon the constant genitalic differences.

Thalycra acuta has been collected at light and in bait traps in areas in the southwestern United States where *Pinus ponderosa* is abundant. It appears to be restricted to relatively high elevations and is one of the most abundant species in Arizona and New Mexico.

14. *Thalycra keltoni*, new species[1]

Figs. 27, 41, 55, 75, 92, 95, 96; Map 11

Diagnosis.—The males have the fore tarsus scarcely expanded, at least one distinct tooth on the outer margin of the fore tibia, and the inner margin of the

[1]See Addenda

hind tibia straight and lacking noticeable serrations for most of its length. These characters place *keltoni* with *monticola* and with some specimens of *murrayi*. It can be separated from these species by the shape of the apices of the parameres of the genitalia (Fig. 41) which are slightly bent outwardly.

In the females, the distinct median apical hump on the fifth sternite (Figs. 95, 96) and the shape of the genitalia (Fig. 75) will distinguish *keltoni* from all of the other species.

Holotype.—Male, length 4.7 mm., greatest width 2.8 mm. Color dark reddish-brown. Clypeus slightly tumid; delimited posteriorly by a punctate indentation, which terminates on each side in a shallow pit near the mandibular insertions. Vertex and clypeus coarsely punctate; punctures nearly contiguous, with anterior margins slightly elevated. Pronotum rather evenly punctate; punctures similar to those on vertex but more variable in size and usually separated by a distance of one-fourth to one-half diameter; many of the reddish-yellow dorsal setae arising from punctures lacking due to abrasion. Lateral pronotal band of setae composed of nearly contiguous setae (where not abraded) approximately 0.06 mm. in length; posterior marginal line of pronotum distinct except near lateral angles. Elytral disc distinctly punctate basally; punctures more oval than those on pronotum, separated from each other by approximately one diameter, becoming small to obsolete near elytral apices. Most punctures bearing reddish-yellow setae. Surface between punctures smooth and shining basally, becoming alutaceous and dull near elytral apices. Abdomen with six visible ventral segments, the first nearly three times the length of the second; second, third, and fourth subequal; fifth segment one and one-fourth times as long as fourth. Fifth segment with a relatively large, somewhat flattened tubercle on midline at apex (Fig. 92).

Fore tarsus very slightly enlarged. Fore tibiae moderately expanded outwardly at apices, with two distinct teeth along outer margin of right tibia and with three teeth on left tibia. Inner margin of hind tibia straight and lacking any serrations for most of its length (Fig. 27). Capsule of genitalia (Fig. 41) lacking a distinct median notch, acutely rounded at apex. Apices of genitalia (Fig. 41) sharply rounded and turned outwardly. Internal sac (Fig. 55) with an apical median band of relatively few spines; two distinct, posterior, lateral bands of spines; and a distinctly divided basal piece.

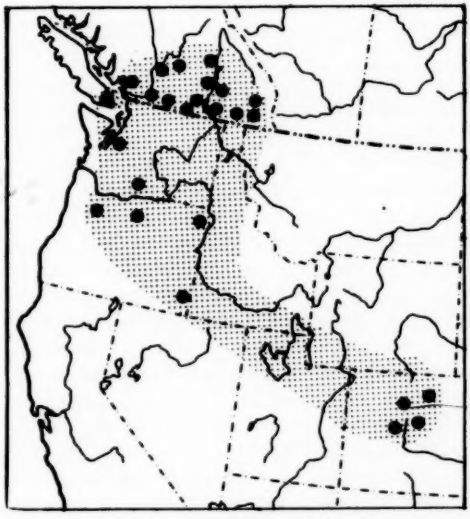
Allotype.—Female, length 4.3 mm., greatest width 2.2 mm. Color reddish-brown. Similar to male except in the following respects: dorsal punctures slightly larger and more closely spaced; elytral surface between punctures finely alutaceous; fore tarsus not expanded; two teeth on outer margin of each fore tibia; abdomen with five visible ventral segments, proportions approximately the same as in male; fifth segment with round hump at apical midline (Figs. 95, 96); female genitalia (Fig. 75) with coxites slightly expanded beyond styli, apices nearly truncate.

Holotype.—Male, McIntyre Road, 3000 ft., Oliver, B.C., May 27, 1958, malt trap No. 3, H. and A. Howden (CNC No. 7023). *Allotype*.—Female, same data as holotype (CNC No. 7023). *Paratypes*, 279 males, 270 females:

CANADA

British Columbia: 1 ♀, Bowser, June 21, 1955, W. J. Brown; 3 ♂ ♂, 3 ♀ ♀, Copper Mtn., June 25, 30, 1929, June 6, 1930, July 4, 1929, G. Stace Smith; 1 ♂, Creston, June 27, 1958, malt trap, H. and A. Howden; 4 ♂ ♂, 2 ♀ ♀, Creston, May 16, 1946, May 25, 1950, June 20, 1946, June 29, 1955, 1956, July 6, 1953, G. Stace Smith; 24 ♂ ♂, 15 ♀ ♀, Fairview Rd., 3000 ft., Oliver, May 31, June

4, 1958, malt trap, H. and A. Howden; 1 ♀, Hope, June 23, 1958, malt trap, H. and A. Howden; 5 ♂ ♂, 11 ♀ ♀, Kamloops, June 24, 1958, malt trap, H. and A. Howden; 1 ♂, 2 ♀ ♀, 28 mi. W. Kamloops, Sept. 3, 1960, malt trap, D. F. Hardwick; 1 ♀, Kuskanook, June 29, 1958, malt trap, H. and A. Howden; 1 ♀, Lorna, June 29, 1924, G. Hopping; 3 ♂ ♂, 4 ♀ ♀, 2 mi. N. W. Lumberton, 3475 ft., 7 mi. W. Cranbrook, June 27, 1959, malt trap, G. B. Leech; 156 ♂ ♂, 131 ♀ ♀, McIntyre Rd., 3000 ft., Oliver, May 27, June 1, 1958, malt trap, H. and A. Howden; 49 ♂ ♂, 56 ♀ ♀, McKinney Rd., 1-12 mi. E. Oliver, June 3, 7, 1958, malt trap, H. and A. Howden; 1 ♀, Oliver, May 15, 1929; 4 ♂ ♂, 6 ♀ ♀, Oliver, July 3, 1959, malt trap, L. A. Kelton; 1 ♀, 5 mi. N. W. Oliver, June 12, 1958, malt trap, H. and A. Howden; 1 ♀, 7 mi. N. Oliver, July 7, 1959, malt trap, L. A. Kelton; 10 ♂ ♂, 12 ♀ ♀, Rt. 3, 4000 ft., E. of Osoyoos, June 2, 5, 1958, malt trap, H. and A. Howden; 2 ♀ ♀, Pender Harbour, June 18, 1928, G. R. Hopping; 6 ♂ ♂, 5 ♀ ♀, 2-4 mi. N. E. Penticton, June 4, 1958, malt trap, H. and A. Howden; 2 ♂ ♂, 7 ♀ ♀, 5-10 mi. S. Penticton, June 4, 1958, malt trap, H. and A. Howden; 1 ♀, Salmon Arm, May 24, 1928, H. B. Leech; 1 ♀, Summerland, May 26, 1936, A. N. Gartrell; 1 ♂, Trinity Valley, June 23, 1927, E. A. Rendell.



Map 11. Distribution of *Thalycra keltoni*, new species.

UNITED STATES

Colorado: 1 ♂, Alma, July 10, 1938, J. W. Green; 1 ♂, Fraser, 8700 ft., July 27, 1940, O. B.; 1 ♂, Glacier Basin, August 5, 1933; 1 ♂, Rocky Mt. Natl. Pk., July, F. E. Winters.

Oregon: 1 ♂, Forest Grove, June 11, 1941, aerial trap; 1 ♂, Gold Center Camp, Blue Mts., June 15, 1944; 1 ♂, Maupin, June 5, 1951; 1 ♂, 4 ♀ ♀, Wallowa Lake, June 25, 1942, J. H. Baker.

Washington: 1 ♂, Seattle, May 24, 1933, S. M. J.; 1 ♀, 33 mi. W. Yakima, Boulder Cave, May 13, 1949, F. Ritz.

Paratypes are deposited in all of the collections from which material was borrowed.

Variation is considerable. Males vary from 3.5 to 6.0 mm. in length and from 1.7 to 2.7 mm. in greatest width. Females vary from 3.4 to 5.9 mm. in length and from 1.7 to 2.7 mm. in greatest width. Color ranges from tan to very dark brownish-black. In both sexes the teeth on the outer margin of the fore tibia vary from one to three in number, with two being normal. Very small specimens often have a single tooth and large specimens often have three teeth with rarely a small fourth tooth being present near the basal end of the tibia. Some variation in dorsal punctures is evident, the punctures being relatively smaller in small specimens. In females, the median apical hump on the fifth sternite shows considerable variation, occasionally being obsolete, particularly in small specimens. Other characters, including the shape of the genitalia, appear relatively uniform.

While the host of *Thalycra keltoni* is unknown, the species seems to be generally restricted to stands of pine, particularly *Pinus ponderosa*. Near Oliver, B.C., the majority of specimens were taken in malt traps at elevations ranging from 3000 to 4000 feet. In the valley, at elevations of 1800 to 2000 feet, ponderosa pine was common, but specimens of *keltoni* were rarely taken.

This species is named in honor of my colleague L. A. Kelton, who collected a large series of *Thalycra* in the Oliver, B.C., area.

15. *Thalycra monticola*, new species[1]

Figs. 25, 42, 57, 74, 91; Map 12

Diagnosis.—The males have the fore tarsus very slightly enlarged, the fore tibia poorly produced outwardly at apex, usually two small teeth on the outer margin of the fore tibia, and the inner margin of hind tibia straight and lacking serrations. These characters will separate *monticola* from all species except *keltoni* and occasionally *murrayi*. The slight expansion of the parameres of the genitalia (Fig. 42) near their apical thirds will separate the males of *monticola* from these species.

The females have the fore tibia as described above and the fifth sternite usually unmodified except for a small transverse apical tuft of setae. These characters, coupled with the western range will usually place the females with *mixta*, and possibly some *murrayi*. The shape of the genitalia (Fig. 74) will readily separate it from *murrayi*, but some specimens cannot be separated from *mixta* except by association with the males.

Holotype.—Male, length 4.3 mm., greatest width 2.2 mm. Color reddish-brown. Clypeus moderately tumid; delimited posteriorly by a nearly impunctate indentation that terminates on each side in a shallow pit near the mandibular insertions. Vertex and clypeus coarsely, nearly contiguously punctate. Pronotum rather evenly punctate, punctures relatively large, usually separated by approximately one-fourth diameters; each puncture with a reddish-yellow seta, except where abraded. Lateral pronotal band of setae composed of nearly contiguous setae approximately 0.07 mm. in length; posterior marginal line of pronotum distinct except near lateral angles. Elytral disc distinctly setate-punctate basally; punctures smaller than those on pronotum, separated by approximately one-half diameters, becoming obsolete posteriorly. Surface between punctures very finely alutaceous, shining anteriorly, dull posteriorly. Abdomen with six visible ventral segments, the first nearly three times as long as second; second, third, and fourth subequal; fifth segment one and one-half times as long as fourth. Fifth segment with a small, rounded tubercle on midline at apex (Fig. 91).

[1]See Addenda

Fore tarsus very slightly enlarged. Fore tibia only slightly produced outwardly at apex (similar to *mixta*) and with two small teeth on the outer margin. Inner margin of hind tibia straight, not serrate (Fig. 25). Capsule of genitalia (Fig. 42) with a broad setate area, slightly notched at median apex and rather evenly arcuate on each side of notch. Genitalia (Fig. 42) with parameres somewhat expanded near apical third, the apices slightly separated; median lobe irregularly rounded. Internal sac (Fig. 57) with a broad median apical band of small spines, two posterior lateral bands of spines, and a small V-shaped basal piece.

Allotype.—Female, length 4.0 mm., greatest width 1.8 mm. Color reddish-brown. Similar to the male except in the following respects: dorsal punctures slightly smaller; fore tibiae with one tooth on outer margin of right tibia, two teeth on left tibia; fore tarsus not expanded; abdomen with five visible ventral segments; first segment two and one-half times length of second, remaining segments with proportions similar to male; fifth segment with transverse median apical tuft of setae, tubercle lacking; female genitalia (Fig. 74) with coxites moderately broad, not widened beyond styli, abruptly rounded at apices and nearly contiguous.

Holotype.—Male, 2 mi. N. W. Lumberton, 3475 ft., 7 mi. W. Cranbrook, B.C., June 27, 1959, malt trap, G. B. Leech (CNC No. 7028). *Allotype.*—Female, same data as holotype (CNC No. 7028). *Paratypes,* 48 males, 46 females:

CANADA

British Columbia: 1 ♀, Caithness, 2800 ft., near Cranbrook, July 25, 1959, malt trap, G. B. Leech; 1 ♀, Hope Mts., August 6, 1932, A. N. Gartrell; 4 ♂♂, 2 ♀♀, 2 mi. N. W. Lumberton, 3475 ft., 7 mi. W. Cranbrook, June 27, 1959, malt trap, G. B. Leech; 18 ♂♂, 17 ♀♀, Terrace, July 15, 16, 1960, malt trap, W. R. Richards.

UNITED STATES

Arizona: 1 ♂, Southern Arizona, August 1902, F. H. Snow; 1 ♂, 2 ♀♀, Springerville, 9200 ft., Apache Co., August 20, 1935, I. J. Cantrall, (No. 172).

California: 1 ♂, 2 ♀♀, Ash Mt. R., Sequoia Natl. Pk., April 25, 1949, April 28, 1950; 2 ♂♂, 6 ♀♀, Big Trees, Calaveras Co., 4700 ft., July 20, 1907; 1 ♂, Carmel, Monterey Co.; 3 ♂♂, 1 ♀, Fallen Leaf Lake, Tahoe, July 6, 9, 1915; 1 ♂, Junipero Serra Pk., Santa Lucia Mts., Monterey Co., August 16, 1956, H. B. Leech; 1 ♂, Kings River Can. Natl. Pk., June 25, 1941, A. T. McClay; 2 ♂♂, 1 ♀, Mt. Wilson, A. Fenyes; 1 ♂, Paradise Valley, Kings River, 7000 ft., Fresno Co., July 16, 1910; 1 ♂, Placer Station, Madera Co., June 23, 1914; 3 ♂♂, 7 ♀♀, Pollock Pines, El Dorado Co., June 24, 1938, June 23, 1939, July 8, 1939, A. T. McClay; 2 ♂♂, Riverton, El Dorado Co., July 18, 1931, E. C. Zimmerman; 2 ♂♂, 1 ♀, Round Meadow, Giant Forest, (Tulare Co.) June 20, 1925, Hopping; 1 ♂, Sugar Pine (Madera Co.), 1920, E. Schiffel; 2 ♂♂, 5 ♀♀, Tallac (El Dorado Co.), June, July.

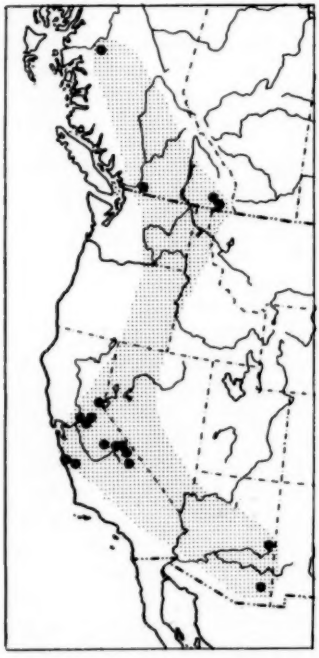
Nevada: 1 ♂, Charleston Mts., Kyle Canyon, Clark Co., July 22, 1950, E. C. Johnston.

Paratypes are deposited in the following collections: AMNH, CAS, CNC, OSU, USNM, UCD, UA, UnKa, UnMich, Nelson.

Variation is only moderate. Males vary from 2.9 to 4.7 mm., in length and from 1.9 to 2.8 mm. in greatest width. Females vary from 3.5 to 4.9 mm. in length and from 2.0 to 2.6 mm. in greatest width. Color ranges from tan to a dark brownish-black. The number of teeth on the outer margin of the fore tibia varies from one to three, but usually two teeth are present. Small specimens

have relatively small punctures, but most other external characters show little variation. In the male genitalia the amount of expansion near the apex of the parameres as well as the degree of curvature of the sides shows a moderate degree of variation, but is not so extreme that the species cannot always be identified. The genitalia of the females occasionally are slightly expanded beyond the styli, and this variation makes it impossible to distinguish some females of *monticola* from females of *mixta*. However, *monticola* is generally a smaller species than *mixta* and usually has two teeth on at least one of the fore tibiae, while *mixta* usually has only one very small tooth on each fore tibia. A few females have a swelling on the fifth abdominal segment similar to that of *keltoni*. A single male, measuring 3.9 mm., in the University of Michigan collection from Natchitoches, La., appears to be *monticola*, but more material is needed to ascertain if it is actually this species. All other Louisiana specimens seen are *T. carolina* (Wick.).

Nothing is known of the habits of *monticola*. It appears to be a rather uncommon species, usually taken at relatively high elevations.



Map 12. Distribution of *Thalycra monticola*, new species.

16. *Thalycra leechi*, new species

Figs. 9, 26, 43, 60, 76, 78, 93; Map 13

Diagnosis.—In both sexes the labrum is truncate or nearly so. This character will serve for identification if not obscured, since in all other species the labrum is shallowly emarginate to distinctly bilobed. If obscured, the following characters will serve:

In the males the fore tarsus is not expanded and the hind tibia has the inner margin straight or bowed slightly outward and lacking noticeable serrations. These characters will separate this western species from all others except *murrayi*,

keltoni, and *monticola*. The irregular, nearly contiguous pronotal punctures with the anterior margins raised, and the broad, somewhat flattened teeth on the truncate apical edge of the fore tibia will usually separate *leechi* from the three species named above. The genitalic capsule with the long setae at the lateral angles is very distinctive.

In the females the following combination of characters will usually separate the females of *leechi* from all others: outer margin of fore tibia with one or more (usually two) large distinct teeth; teeth on truncate apex of fore tibia broad and flattened; punctures of pronotum irregular, nearly contiguous, with anterior margins elevated, giving the pronotum a roughened appearance.

Holotype.—Male, length 4.6 mm., greatest width 2.2 mm. Color reddish-brown. Labrum truncate. Clypeus scarcely tumid; delimited posteriorly by a vague punctate indentation. Vertex and clypeus very coarsely, contiguously punctate, the anterior margins of punctures elevated. Pronotum with deep circular punctures which have the anterior margins elevated, giving pronotum an irregular, roughened appearance; most dorsal punctures with long conspicuous setae. Lateral pronotal band of setae composed of nearly contiguous setae approximately 0.08 mm. in length; posterior marginal line of pronotum fine medially, obsolete laterally. Elytral disc distinctly punctate; punctures basally similar to those of pronotum but more widely spaced, separated by about one-half diameter; punctures near elytral apices small and shallow. Most elytral punctures bearing fine yellowish setae of moderate length. Surface between punctures shining, becoming finely alutaceous only at elytral apices. Abdomen with six visible ventral segments, the first three times as long as second; second, third, and fourth subequal; fifth segment one and one-half times as long as fourth. Fifth segment with an abruptly elevated, longitudinal tubercle on midline at apex (Fig. 93).

Antenna (Fig. 78) with second and third segments subequal (in most species the third segment is slightly longer). Fore tarsus not enlarged. Fore tibia (Fig. 9) only slightly to moderately expanded at apex; two distinct teeth along outer margin; truncate apex of fore tibia with four large, broad, somewhat flattened teeth. Inner margin of hind tibia (Fig. 26) nearly straight, slightly bowed outwardly at middle. Capsule of genitalia (Fig. 43) acutely round at tip, lateral angles each with a row of long setae. Genitalia (Fig. 43) with parameres evenly arcuate and tapered to tips; median lobe bluntly pointed. Internal sac (Fig. 60) with a small, indistinct, apical band of spines; a small median patch of spines just anterior to two posterior lateral bands of spines; a fine posterior median band; and an inverted U- or V-shaped basal piece. The relative length of the extended internal sac appears to be less than in any other species of *Thalycra*.

Allotype.—Female, length 5.0 mm., greatest width 2.4 mm. Color brown. Similar to male except in following respects: indented line at base of clypeus with scattered coarse punctures; pronotal punctures with anterior margins elevated, but to a lesser degree than in male; fore tibia distinctly expanded outward at apex; right fore tibia with three large teeth along outer margin; left fore tibia with four large teeth; abdomen with five visible segments, the first two and one-half times as long as second; fifth segment twice as long as fourth and with a transverse median row of erect setae adjacent to apical margin; female genitalia (Fig. 76) with sides of coxites rounded beyond the short styli.

Holotype.—Male, Kamloops, B.C., June 24, 1958, malt trap, H. and A. Howden (CNC No. 7029). *Allotype*.—Female, McIntyre Road, 3000 ft., Oliver, B.C., May 29, 1958, malt trap No. 3, H. and A. Howden (CNC No. 7029). *Paratypes*, 20 males, 13 females:

CANADA

British Columbia: 1 ♀, Creston, May 24, 1945, sweeping, Stace Smith; 1 ♂, 1 ♀, Kamloops, June 24, 1958, malt trap, H. and A. Howden; 1 ♀, McIntyre Rd., 3000 ft., Oliver, May 27, 1958, malt trap, H. and A. Howden; 1 ♂, Midday Valley, Merritt, September 4, 1924, K. F. Auden; 1 ♂, 2.7 mi. N. E. Penticton, June 4, 1958, malt trap, H. and A. Howden; 2 ♂ ♂, 1 ♀, 5-10 mi. S. Penticton, June 4, 1958, malt trap, H. and A. Howden; 1 ♂, Richter Pass Rd., 4 mi. W. Osoyoos, June 2, 1958, malt trap, H. and A. Howden.

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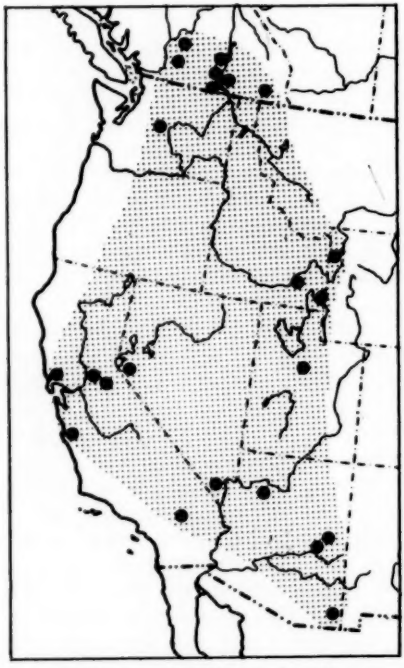
Arizona: 1 ♀, Carrizo, June 20, 1957, bait trap, Butler and Werner; 1 ♂, Chiricahua Mts., Onion Saddle, Sept. 10, 1960, malt trap, H. F. Howden; 1 ♂, 3 ♀ ♀, Indian Creek Camp, Prescott Natl. Forest, June 28, 1957, at light, G. H. Nelson; 1 ♂, Showlow, Navajo Co., June 25, 1950, E. C. Johnston.



Map 13. Distribution of *Thalycra leechi*, new species.

California: 2 ♂ ♂, Carmel, September 10, 1924, October 6, 1933, L. S. Slevin; 1 ♂, Mt. Tamalpais, Marin Co., June 20, 1909; 1 ♀, Pollock Pines, El Dorado Co., June 23, 1939, A. T. McClay; 1 ♂, Sacramento, August 2, 1935, A. T. McClay; 2 ♀ ♀, Santa Rosa Mt., June 5, 25, 1946, D. J. and J. N. Knull.

Idaho: 1 ♀, Bear Pass Creek, Butte Co., July 26, 1947, R. M. Bohart; 1 ♂, Wasatch Mts., 8200 ft., Bloomington Lake, July 8, 1952, B. Malkin.

Nevada: 3 ♂ ♂, Charleston Mts., Kyle Canyon, Clark Co., May 29, 1950, H. E. Cott, July 22, 1950, E. C. Johnston; 1 ♂, Clear Creek, Tahoe Natl. Forest, July 25, 1938.

Utah: 1 ♀, Stockton, Knaus.

Washington: 1 ♂, Wenatchee, September 15, 1938, J. Standish.
Wyoming: 1 ♂, National Park, August 10, Hubbard and Schwarz.

Paratypes are deposited in the following collections: AMNH, CAS, CNC, CU, OSU, USNM, UA, UCD, Connell, Gillogly, Hatch, Howden, Nelson, Stace Smith.

Variation in the relatively small series available is considerable. Males vary from 3.6 to 4.6 mm. in length and from 1.8 to 2.3 mm. in greatest width. Females vary from 3.4 to 5.0 mm. in length and from 1.5 to 2.4 mm. in greatest width. Color ranges from a dark tan to dark reddish-brown or brown. The labrum appears normally truncate, being slightly emarginate in some specimens. However, this character is often dixcult to see because of dirt or abrasion. The raised anterior margins of the dorsal pronotal punctures show differences between the sexes, the females having the margins less distinctly raised. Abrasion also affects this character, the margins of punctures appearing fairly uniform in some badly worn specimens. The teeth on the outer margin of the fore tibia vary from one to four. Both the teeth on the outer margin and on the truncate apex of the fore tibia are subject to abrasion, making the flattened appearance of the teeth obscure. The inner margin of the hind tibia is very similar in both sexes. The shape of the genitalic capsule varies considerably, being sharply or broadly rounded at the apex and with the apex often with a small notch. The lateral band of long setae is always present near the lateral angles. The genitalia in both sexes are quite uniform.

Nothing is known about the habits of this uncommon species. A few specimens were taken in British Columbia in malt traps set in areas where *Pinus ponderosa* predominated.

This interesting species is named in honor of the Leech brothers, H. B. and G. B., both of whom furnished me with many specimens used in the present study.

Pseudothalycra, new genus

Body (Fig. 2) strongly, transversely convex; pronotal and elytral margins not readily visible from above. Dorsal surfaces tuberculate; long setae arising from irregular depressions just posterior to the tubercles. Color tan to brown. Labrum truncate to slightly emarginate, with a few erect setae arising in front of the anterior median edge. Clypeus elevated above the labrum anteriorly, very slightly convex, delimited posteriorly by a vague transverse concavity.

Antennae 11-segmented, proportions of the segments as indicated in Fig. 79. Club three-segmented, compact; terminal segment recessed into second segment so that terminal appears very short. Mandibles visible from above, extending beyond labrum, abruptly inflexed in outer half, acute at tip with a small inner tooth near apex. Labial palps three-segmented; the first segment minute, the terminal segment conical. Maxillary palps four-segmented, the terminal segment conical. Antennal grooves poorly developed, not extending beyond base of eyes. Pronotum convex; anterior angles slightly obtuse; narrowly arcuately margined laterally; posterior marginal line obsolete, margin slightly sinuate. Lateral pronotal margins with a fairly regular band of very long setae. Scutellum irregularly setate-punctate; three-fifths as long as wide, nearly one-fifth as wide as elytra.

Each elytron slightly more than twice as long as wide; margined laterally with long, irregularly spaced setae. Sutural interval present only in the apical half, other intervals absent. Humeral umbone poorly developed, elytral apices rounded. Abdomen covered by elytra, only pygidium exposed. Pygidium wider than long, broadly arcuate at apex, surface punctate-tuberculate.

Fore coxae slightly more widely separated than middle coxae. Prosternum depressed and slightly expanded behind fore coxae, not prolonged posteriorly. Mesosternum not carinate; metasternum with midline shallowly depressed in basal half, surface moderately coarsely punctate with anterior margins of punctures raised, forming vague tubercles. Abdomen with first and fifth segments longer than the second, third, or fourth; a sixth segment (actually eighth tergite) visible in the males and forming a capsule around the genitalic capsule. Male genitalia with capsule (tegmen) enclosing the sclerotized parameres and aedeagus. Internal sac short in comparison to *Thalycra* (see Figures) and with spines greatly reduced in number. Female genitalia with coxites widely separated near apices; styli more basal in position than in *Thalycra*.

Fore tarsus of males scarcely enlarged. Fore tibia evenly expanded from base to apex, not suddenly expanded at outer apical margin. Fore tibia with large flattened teeth on apex and along outer margin. Mesothoracic and metathoracic tibiae with large, heavy spines along outer margins and at apices; not differing noticeably in shape between the sexes.

Genotype: *Pseudothalycra knulli*, new species.

This genus is closely related to *Thalycra* but is obviously different in body shape, particularly in convexity, in the length and arrangement of the setae, and in the genitalic characters. The close relationship between *Pseudothalycra* and *Thalycra* is most readily noted in *T. leechi*, which is intermediate in several characters. In *leechi* the pronotum approaches the tuberculate appearance of *Pseudothalycra*, the teeth on the fore tibia are somewhat flattened, the labrum is truncate or nearly so, and the length of the internal sac of the male genitalia appears intermediate between the two genera. However, all other characters of *leechi* are typical of the genus *Thalycra*, to which it undoubtedly belongs.

1. *Pseudothalycra knulli*, new species

Figs. 2, 10, 11, 44, 61, 77, 79, 94; Map 14

Diagnosis.—Both sexes can be separated from other North American Nitidulidae by their transverse convexity, dorsal tuberculate appearance, very long setae along lateral margins of pronotum and elytra, large flattened teeth on the margins of the fore tibiae, large spines along outer margins of middle and hind tibiae, and by the genitalic characters.

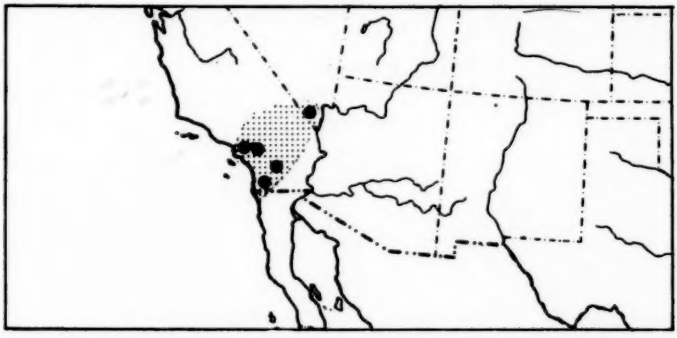
Holotype.—Male, length 3.7 mm., greatest width 1.7 mm. Color light brown. Clypeus almost flat, distinctly tuberculate; delimited posteriorly by a vague transverse concavity which ends above the antennal insertions. Frons and vertex almost flat, strongly tuberculate; and with a moderately distinct ridge above antennal insertions. Pronotum distinctly, evenly, closely tuberculate; tubercles smaller than on head, each with a long yellowish seta arising posteriorly from its base. Lateral pronotal margin fine, having a band of nearly contiguous setae approximately 0.15 mm. in length; posterior marginal line of pronotum obsolete. Elytral disc, particularly basally, tuberculate-punctate; the punctures are just posterior to tubercles and bear fine reddish-yellow setae. Surface between tubercles and punctures smooth and shining, becoming alutaceous apically. Elytral margins with an irregular band of very long setae. Abdomen with six visible ventral segments, the first two and one-half times as long as second; second, third, and fourth subequal; fifth segment one and one-fourth times as long as fourth. Fifth segment with a small rounded tubercle on midline at apex (Fig. 94).

Fore tarsus very slightly enlarged. Fore tibia (Fig. 10) gradually expanded to apex which bears four large flattened teeth; one large tooth is present on outer

margin. Inner margin of hind tibia (Fig. 11) nearly straight and lacking any serrations. Capsule of genitalia (Fig. 44) obtusely pointed at median apex, sides rounded. Genitalia (Fig. 44) with parameres evenly curved inwardly to nearly contiguous apices; apex of median lobe almost truncate, slightly curved anteriorly near midline. Internal sac (Fig. 61) short, with a few scattered, median apical spines; two short lateral bands of spines; a fine median band of spines; and an oval basal piece.

Allotype.–Female, length 4.0 mm., greatest width 2.0 mm. Color reddish-brown. Similar to male except in the following respects: dorsal tubercles slightly more pronounced; fore tibia with two large teeth along outer margin; abdomen with five visible segments, the first four segments as described in male; fifth segment twice as long as fourth and lacking tubercle; apex of fifth segment with a transverse row of scattered long setae; female genitalia (Fig. 77) with coxites diverging, styli short and near bases of coxites.

Holotype.–Male, Santa Rosa Mts., Calif., June 25, 1946, D. J. and J. N. Knull (OSU). *Allotype.*–Female, Kyle Canyon, Charleston Mts., Clark Co., Nevada, July 22, 1950, E. C. Johnston (CNC No. 7140). *Paratypes,* 1 male, 3 females: 1 ♀, same data as type (Howden); 1 ♂, Alpine, Calif., Aug. 6, 1914 (CU); 1 ♀, Tanbark Flat, Los Angeles Co., Calif., July 16, 1952, A. T. McClay (UCD); 1 ♀, Tujunga, Calif., June 24, 1945, L. R. Gillogly, on *Ithyphallus impudicus* (Gillogly).



Map 14. Distribution of *Pseudothalycra knulli,* new species.

Variation in the series is slight. Color ranges from tan to reddish-brown. The male paratype measures 3.6 mm. in length and 1.7 mm. in greatest width. The females vary from 3.3 to 4.2 mm. in length and from 1.6 to 2.0 mm. in greatest width. The number of teeth on the fore tibia varies from one to three in both sexes. The long lateral setae are matted or partly abraded on several of the specimens. No other obvious variation was noted.

Habits of the species are unknown. One specimen was labelled as collected on *Ithyphallus impudicus,* a "stink-horn" fungus. This may indicate a host preference for *Pseudothalycra* that differs from the species of *Thalycra* which have been taken on various species of *Rhizopogon.*

The above species is named in honor of J. N. Knull, Ohio State University, who collected the type and who has furnished me with many interesting specimens.

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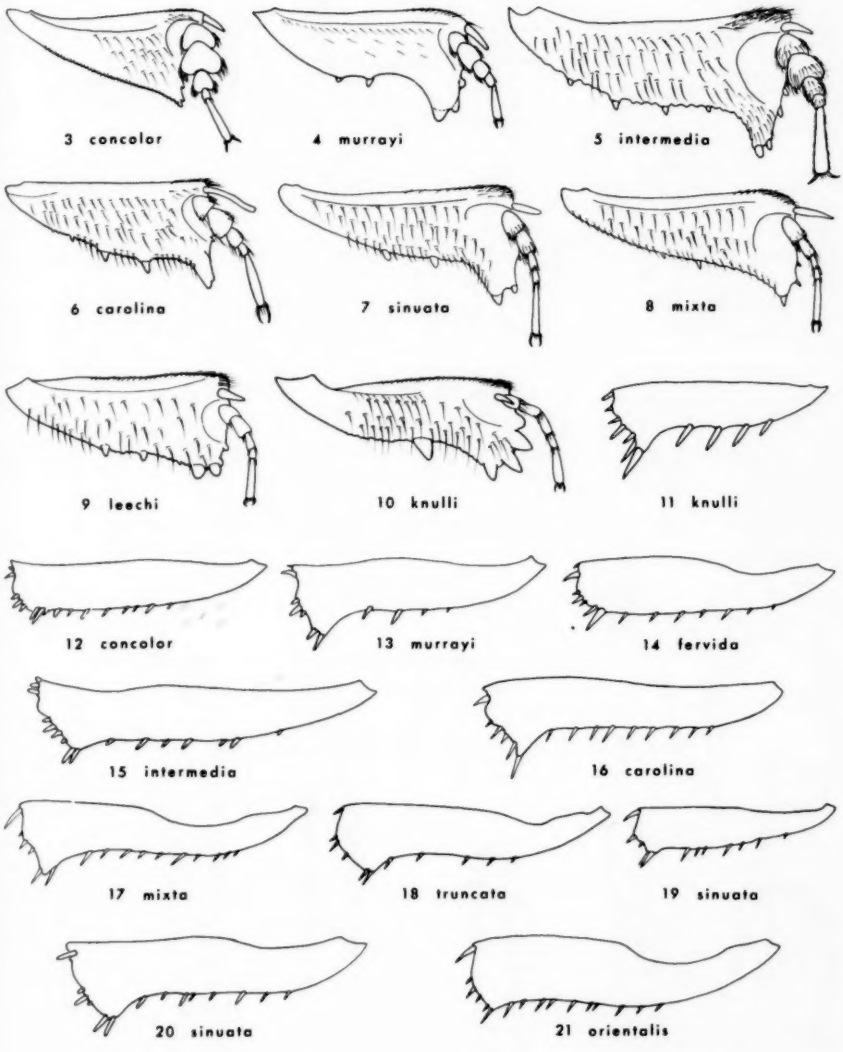
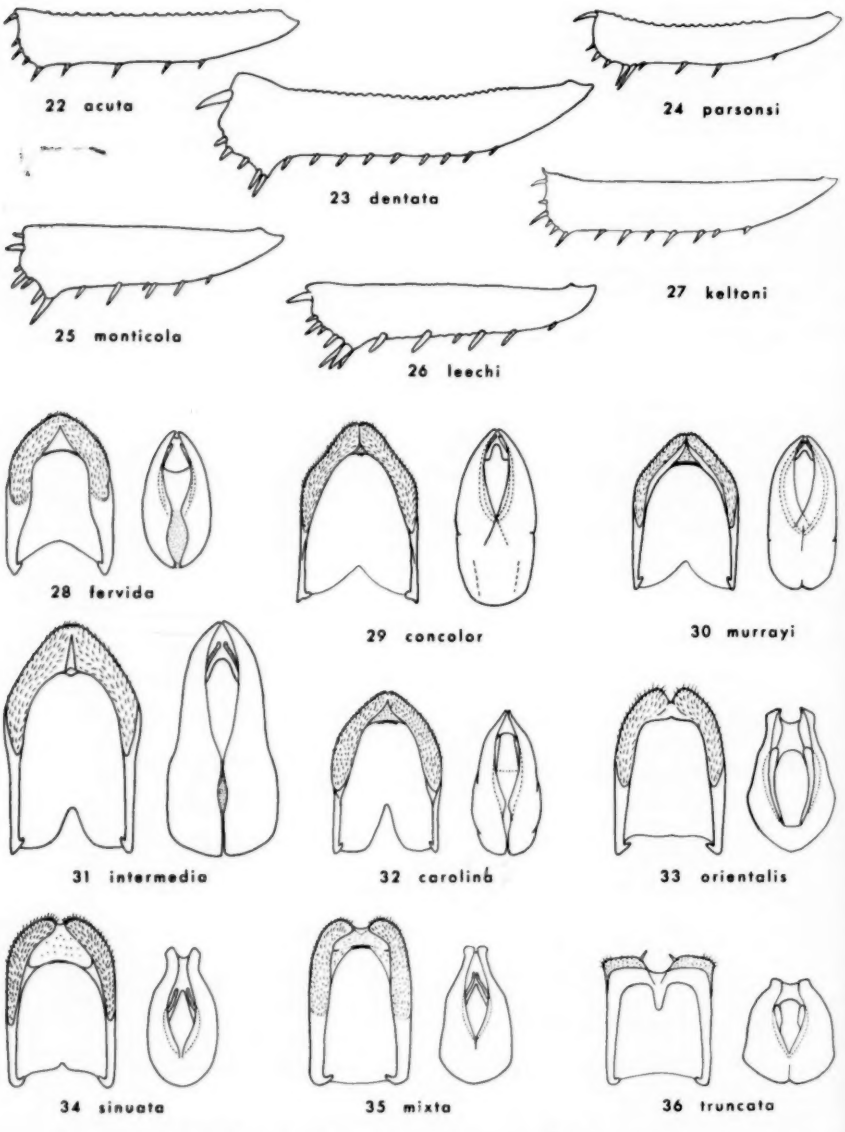


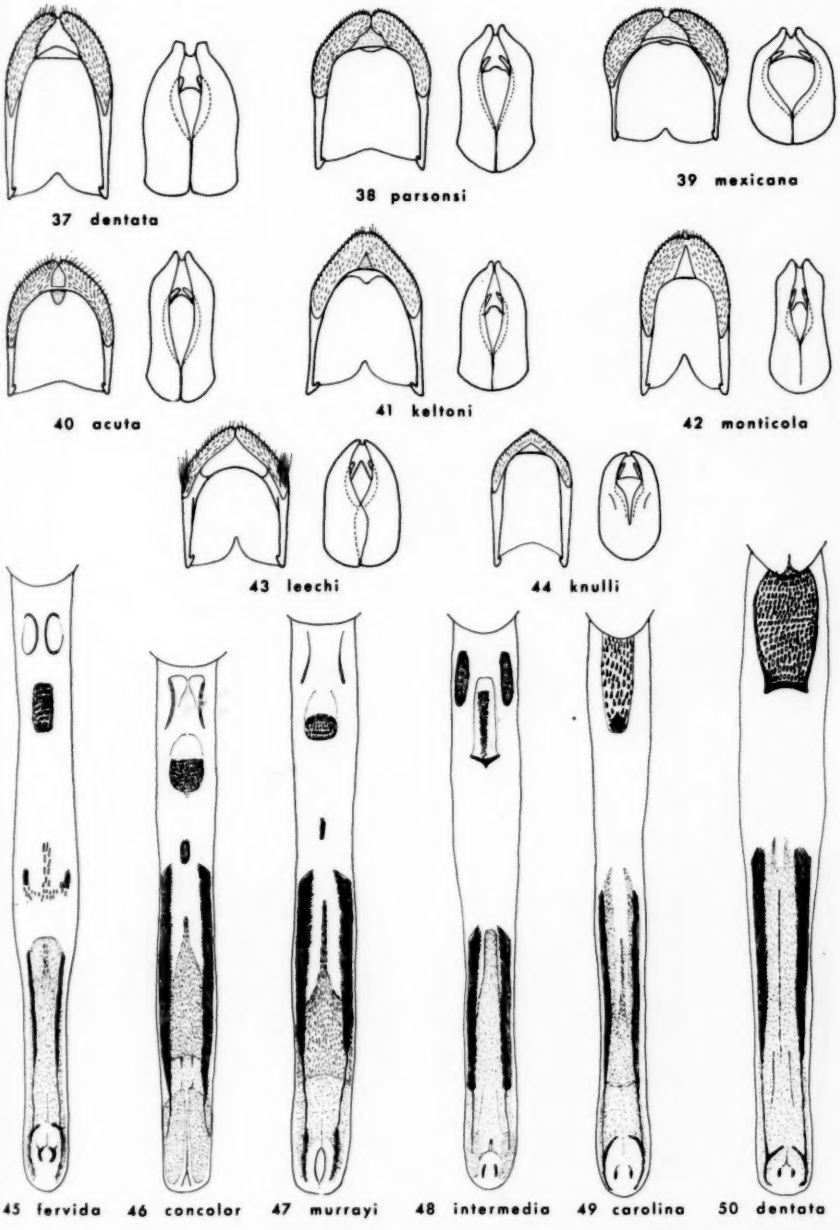
Figs. 3-10. Fore tibia of male of: 3. *Thalycra concolor*, 4. *T. murrayi*, 5. *T. intermedia*, 6. *T. carolina*, 7. *T. sinuata*, 8. *T. mixta*, 9. *T. leechi*, 10. *Pseudothalycra knulli*.

Figs. 11-21. Hind tibia of male of: 11. *Pseudothalycra knulli*, 12. *Thalycra concolor*, 13. *T. murrayi* (lectotype), 14. *T. fervida*, 15. *T. intermedia*, 16. *T. carolina*, 17. *T. mixta*, 18. *T. truncata*, 19. Small *T. sinuata*, 20. Large *T. sinuata*, 21. *T. orientalis*.



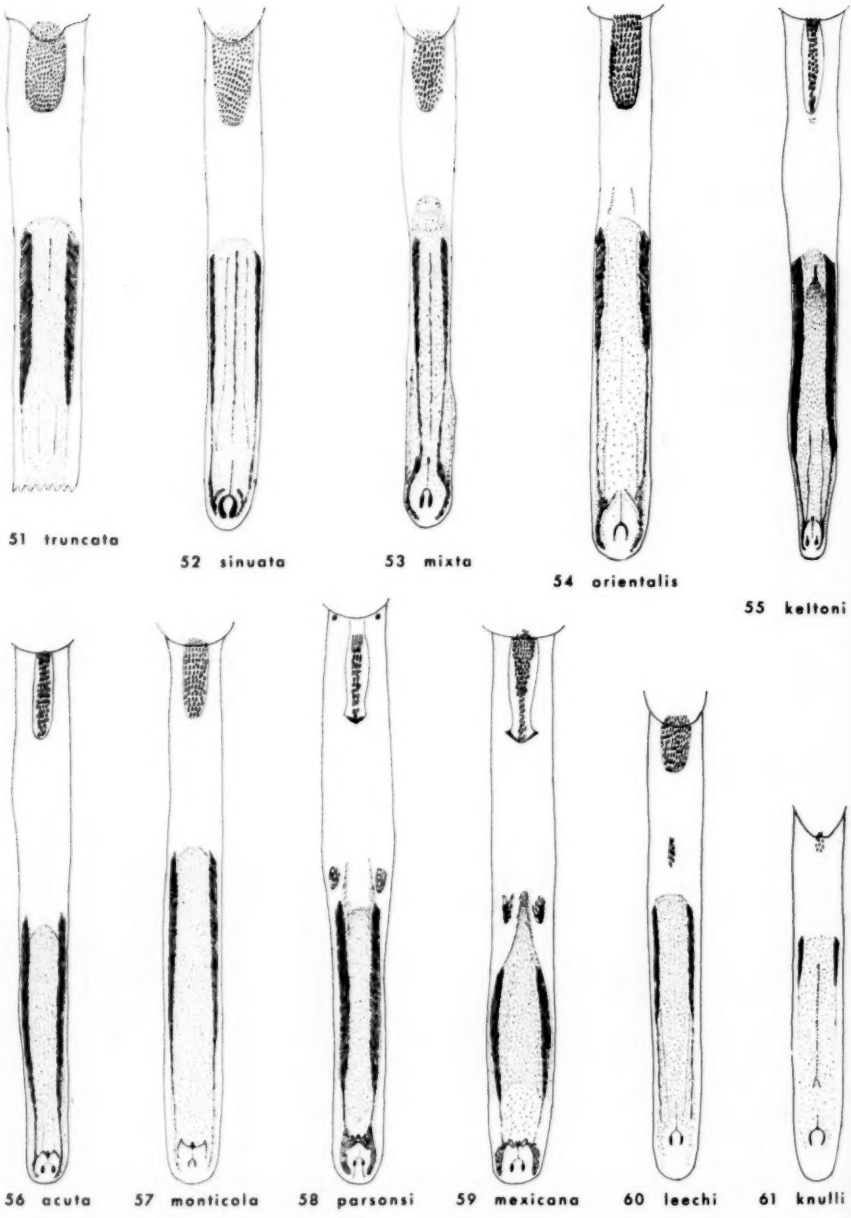
Figs. 22-27. Hind tibia of male of: 22. *Thalycra acuta*, 23. *T. dentata*, 24. *T. parsonsi* (*T. mexicana* similar), 25. *T. monticola*, 26. *T. leechi*, 27. *T. keltoni*.

Figs. 28-36. Genital capsule and genitalia of male of: 28. *Thalycra fervida*, 29. *T. concolor*, 30. *T. murrayi*, 31. *T. intermedia*, 32. *T. carolina*, 33. *T. orientalis*, 34. *T. sinuata*, 35. *T. mixta*, 36. *T. truncata*.

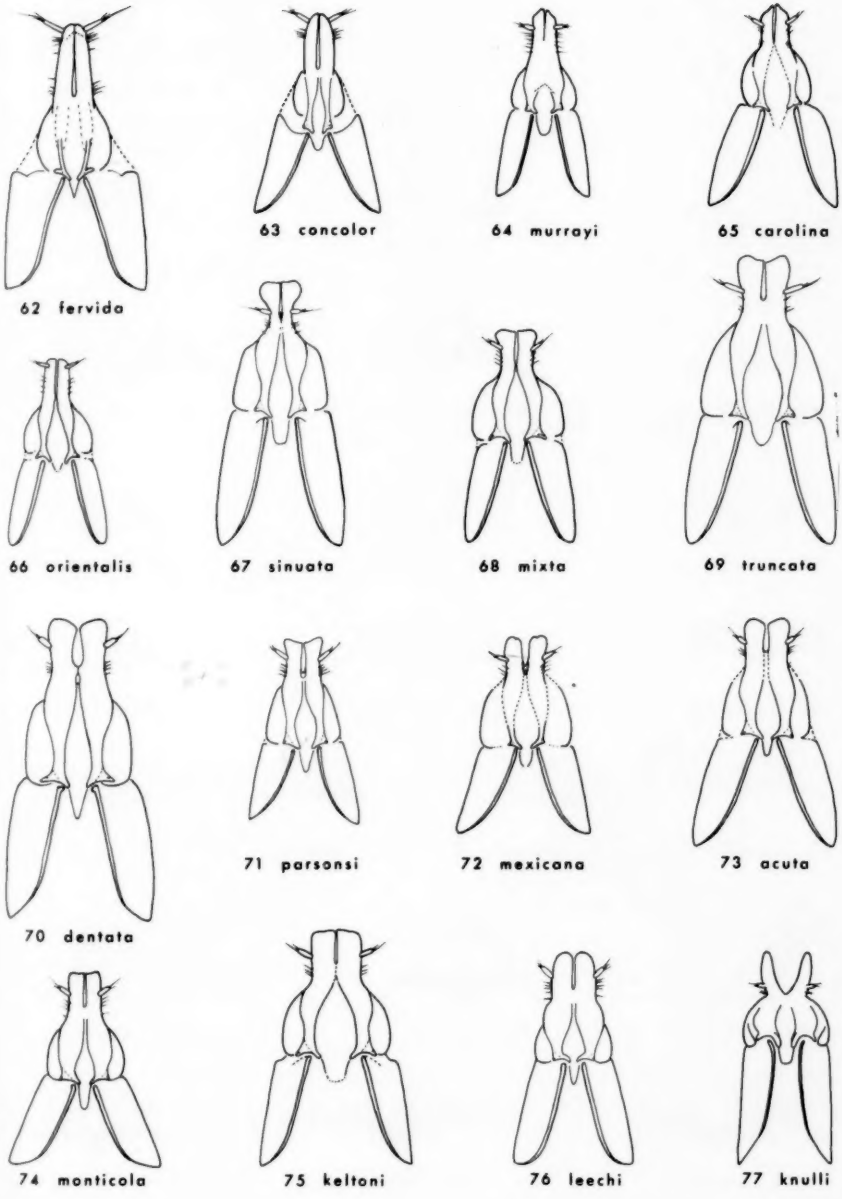


Figs. 37-44. Genital capsule and genitalia of male of: 37. *Thalycra dentata*, 38. *T. parsonsi*, 39. *T. mexicana*, 40. *T. acuta*, 41. *T. keltoni*, 42. *T. monticola*, 43. *T. leechi*, 44. *Pseudothalycra knulli*.

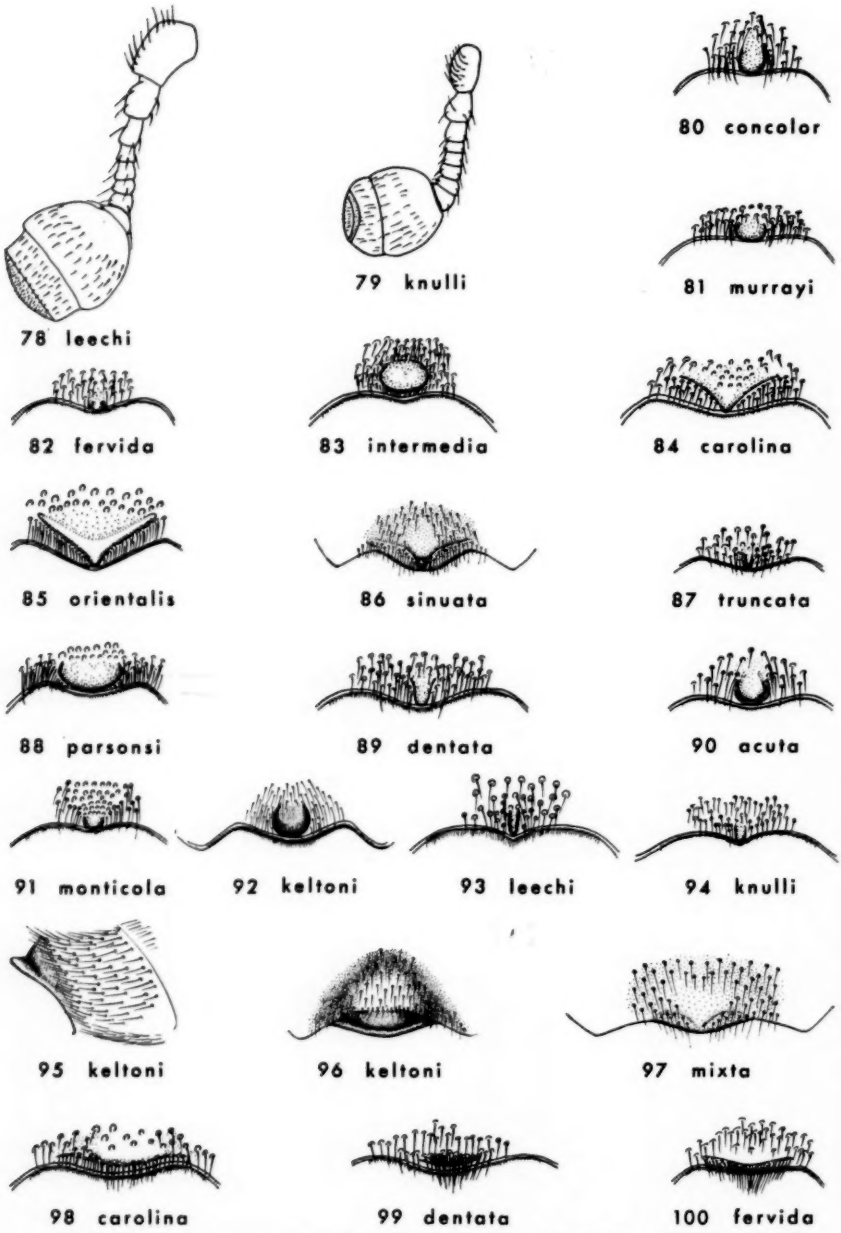
Figs. 45-50. Internal sac of males of: 45. *Thalycra fervida*, 46. *T. concolor*, 47. *T. murrayi*, 48. *T. intermedia*, 49. *T. carolina*, 50. *T. dentata*.



Figs. 51-61. Internal sac of males of: 51. *Thalycra truncata*, 52. *T. sinuata*, 53. *T. mixta*, 54. *T. orientalis*, 55. *T. keltoni*, 56. *T. acuta*, 57. *T. monticola*, 58. *T. parsonsi*, 59. *T. mexicana*, 60. *T. leechi*, 61. *Pseudothalycra knulli*.



Figs. 62-77. Genitalia of female of: 62. *Thalycra fervida*, 63. *T. concolor*, 64. *T. murrayi*, 65. *T. carolina*, 66. *T. orientalis*, 67. *T. sinuata*, 68. *T. mixta*, 69. *T. truncata*, 70. *T. dentata*, 71. *T. parsonsi*, 72. *T. mexicana*, 73. *T. acuta*, 74. *T. monticola*, 75. *T. keltoni*, 76. *T. leechi*, 77. *Pseudothalycra knulli*.

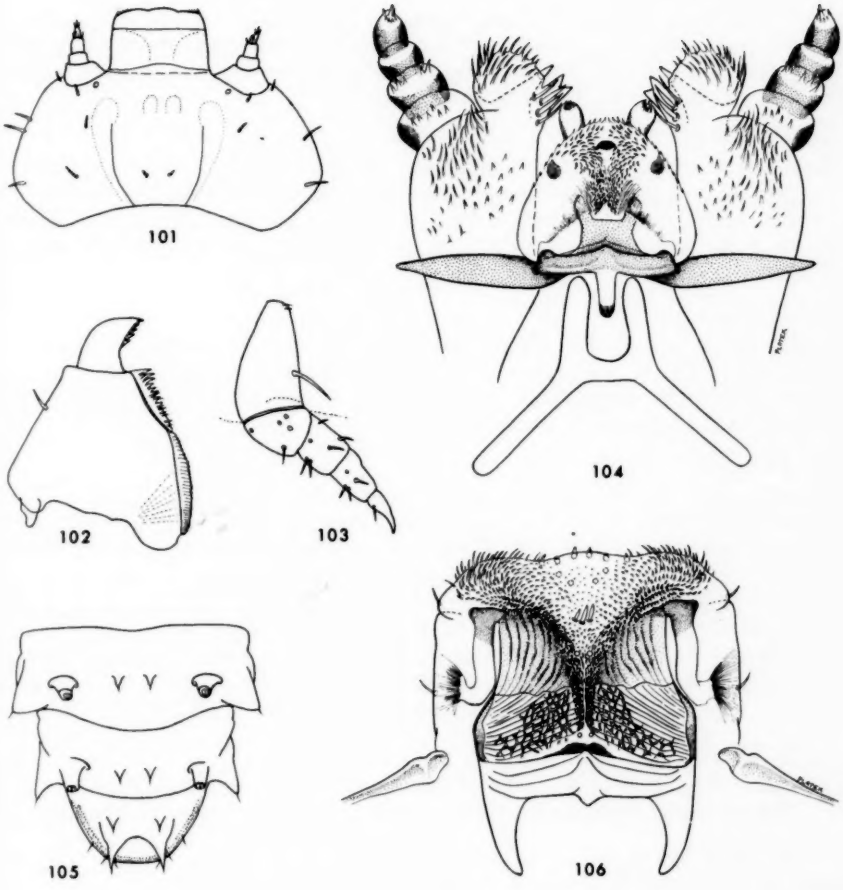


Figs. 78-79. Right antenna of male of: 78. *Thalycra leechi*, 79. *Pseudothalycra knulli*.

Figs. 80-94. Apical median portion of fifth sternite of male of: 80. *Thalycra concolor*, 81. *T. murrayi*, 82. *T. fervida*, 83. *T. intermedia*, 84. *T. carolina*, 85. *T. orientalis*, 86. *T. sinuata* (*T. mixta* similar), 87. *T. truncata*, 88. *T. parsonsi*, 89. *T. dentata*, 90. *T. acuta*, 91. *T. monticola*, 92. *T. keltoni*, 93. *T. leechi*, 94. *Pseudothalycra knulli*.

Fig. 95. Lateral view of fifth sternite of female *Thalycra keltoni*.

Figs. 96-100. Apical median portion of fifth sternite of females of: 96. *Thalycra keltoni*, 97. *T. mixta*, 98. *T. carolina*, 99. *T. dentata*, 100. *T. fervida*.



Figs. 101-106. Third stage larva of *Thalycra sinuata*: 101. Head capsule, 102. Left mandible, 103. Right metathoracic leg, 104. Maxillae, labium, and hypopharynx, 105. Seventh, eighth and ninth dorsal abdominal segments, 106. Epipharynx.

ADDENDA

During the summer of 1961 an additional 647 specimens of *Thalycra* were collected by survey parties of the Entomology Research Institute. No new species were discovered. However the additional specimens show that females of *Thalycra monticola* often (instead of "occasionally" as stated in the key) have a distinct median tumosity on the last ventral segment of the abdomen; this makes them difficult to distinguish from females of *T. keltoni*. A list of the 1961 records is included here, as most of the records represent considerable range extensions. All of the specimens were taken by the writer in malt traps unless the data and/or collectors are specifically listed.

T. acuta

South Dakota: 4 ♂♂, 2 ♀♀, Flynn Creek, 5400 ft., 8 mi. N. of Pringle, July 8-9, 1961; 7 ♂♂, 1 ♀, Game Lodge, Custer St. Park, July 13, 1961; 2 ♂♂, 3 ♀♀, Hot Springs, 3400 ft., July 9, 1961; 1 ♂, 1 ♀, Jct. Rts. 345 and 87, Custer St. Park, July 13, 1961; 1 ♂, 0.8 mi. N. Jct. Rts. 12 and 87, Custer St. Park, July 13, 1961.

T. concolor

South Dakota: 1 ♂, 5 ♀♀, Flynn Creek, 5400 ft., 8 mi. N. of Pringle, July 8-9, 1961; 2 ♂♂, 2 ♀♀, Game Lodge, Custer St. Park, July 13, 1961; 2 ♂♂, 1 ♀, 2 mi. N. Legion Lake, Custer St. Park, July 12, 1961; 1 ♀, 2 mi. S. Sylvan Lake, Custer St. Park, July 13, 1961.

T. dentata

Colorado: 13 ♂♂, 11 ♀♀, 9000 ft., Nederland, July 4, 1961., B. Poole.

South Dakota: 85 ♂♂, 91 ♀♀, Flynn Creek, 5400 ft., 8 mi. N. of Pringle, July 8-9, 1961; 12 ♂♂, 19 ♀♀, Game Lodge, Custer St. Park, July 13, 1961; 18 ♂♂, 23 ♀♀, Harney Peak Sign, Custer St. Park, July 13, 1961; 6 ♂♂, 8 ♀♀, Jct. Rts. 345 and 87, Custer St. Park, July 13, 1961; 4 ♂♂, 4 ♀♀, 2 mi. N. Legion Lake, Custer St. Park, July 12, 1961; 30 ♂♂, 32 ♀♀, 300 yds. N. Sylvan Lake, Custer St. Park, July 13, 1961; 7 ♂♂, 18 ♀♀, 2 mi. S. Sylvan Lake, Custer St. Park, July 13, 1961; 4 ♂♂, 10 ♀♀, nr. 1st. Tunnel N. Jct. 87 and 12, Custer St. Park, July 13, 1961.

T. keltoni

Colorado: 18 ♂♂, 7 ♀♀, 9000 ft., Nederland, July 4, 1961, B. Poole; 1 ♂, Science Lodge, 9500 ft., nr. Nederland, June 29, 1961, Light, M. MacKay.

T. mixta

Colorado: 7 ♂♂, 2 ♀♀, 9000 ft., Nederland, July 4, 1961, B. Poole.

South Dakota: 2 ♂♂, 1 ♀, Harney Peak Sign, Custer St. Park, July 13, 1961.

T. monticola

California: 9 ♂♂, 6 ♀♀, Alta Sierra, 5800′, Kern Co., June 13, 1961, malt and black light; 2 ♀♀, Mill Creek, 14 mi. N. E. Redlands, June 8, 1961; 1 ♀, N. Slope Mt. Tamalpais, 1800 ft., Marin Co., June 24, 1961.

Colorado: 7 ♂♂, 5 ♀♀, 9000 ft., Nederland, July 4, 1961, B. Poole.

South Dakota: 19 ♂♂, 10 ♀♀, Flynn Creek, 5400 ft., 8 mi. N. of Pringle, July 8-9, 1961; 3 ♂♂, 4 ♀♀, Game Lodge, Custer St. Park, July 13, 1961; 6 ♂♂, 8 ♀♀, Harney Peak Sign, Custer St. Park, July 13, 1961; 13 ♂♂, 20 ♀♀, Jct. Rts. 345 and 87, Custer St. Park, July 13, 1961; 2 ♂♂, 3 ♀♀,

300 yds N. Sylvan Lake, Custer St. Park, July 13, 1961; 2 ♂♂, 4 ♀♀, 2 mi. S. Sylvan Lake, Custer St. Park, July 13, 1961; 2 ♂♂, nr. 1st. Tunnel N. Jct. 87 and 12, Custer St. Park, July 13, 1961.

T. murrayi

South Dakota: 1 ♂, 2 mi. N. Legion Lake, Custer St. Park, July 12, 1961.

T. sinuata

California: 2 ♂♂, 3 ♀♀, Camp Angelus, 6000 ft., San Bernardino Mts., June 8, 1961.

Colorado: 2 ♀♀, Boulder, June 17, 1961, Light trap, M. MacKay; 17 ♂♂, 11 ♀♀, 9000 ft., Nederland, July 4, 1961, B. Poole.